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# THE BRICKBVILDER

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H. T. B.

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## ADVERTISING.

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Advertisements will be printed on cover pages only.

## STANDARD FIRE-RESISTING BUILDINGS.

THE Fire Department of the Royal Insurance Company of Liverpool has sent out copies of specifications drawn up with the object of encouraging the construction of fire-resisting buildings. Fire-proof construction as a science develops more slowly in England than it has in this country, and many of the details, as we read them in the English papers, sound like old stories to us, simply because we have had to fight worse conditions here than have ever existed abroad, and what progress we have made in fire-proof construction has been forced upon us by dire necessity. But evidently the Liverpool company have taken a leaf out of our experiences, for their recommendations in regard to fire-proof building include practically all of the features which we have learned are of such vital importance. For example, doors and frames and window frames are to be of iron or other hard metal. Glass above the ground floor is to be not less than ¼ inch thick, in sections not less than 2 square feet, or if of wire glass, in sections not larger than 4 square feet. The height of buildings is not to exceed 80 feet, and the cubic contents of any one compartment are not to exceed 60,000 cubic feet. Brick, terra-cotta or concrete is to be used for external walls, except that stone may be used as a facing when it has a backing of not less than 13 inches of brick. As we understand it, these specifications were prepared to form a standard of fire-resisting construction so far as the insurance companies were concerned and to give direct encouragement to building owners by reducing the rate to those who would build in accordance therewith. We have always maintained that a general application of fire-proof constructive principles in large cities can be better brought about by the rulings of the insurance companies than by any municipal regulations, and our only regret is that the action of the insurance companies should not be more general and that higher premiums should not be put by them upon buildings of anything but the first class.

THE recent fire at Paterson, New Jersey, caused losses which conservative estimates made after the fire have not reduced materially below seven million dollars. Conflagrations relatively disastrous have occurred within a month at Norfolk, Virginia, and at Waterbury, Connecticut. These fires represent a loss to the nation without one single relieving feature unless they can furnish object lessons by which we can profit. There is no excuse for such fires, and there is no reason why the community as a whole should tolerate conditions which lead to them. They can be avoided, and to ascribe such disasters to mere accident is no more justifiable than it is to ascribe them to the hand of God. They are purely and simply the result not of ignorance so much as of selfish indifference to the public well-being, for while the responsibility for constructions which permitted a fire of this sort rests principally upon the owners of the property, the attendant suffering, if not pecuniary loss, comes chiefly upon those who have no hand in the conditions which made such disasters possible.

IN the training of a young child it becomes necessary to repeat and reiterate the ordinary commonplace lessons of growth and development over and over again, year after year, before the child appreciates even in a vague way what is wanted of him. This country with all its tremendous resources, its vast accumulations of wealth and its scientific attainments, is in some ways still very young, and the old familiar lessons of what constitutes good construction have to be reiterated again and again. The time was when property owners gave little thought to fire-proof construction, but we will venture the assertion that there is not a large holder of real estate to-day in any important city who is not at least sufficiently famil-

iar with the distinctions between fire-proof and the ordinary constructions to know the value of each.

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THERE are at least two factors which make for security against fire damage. The first is fire-proof construction itself, and the second is the attitude of the insurance companies towards fire risks. Let us consider them for a moment in detail.

Our cities will never be thoroughly safe while other than fire-proof materials are recognized as suitable for building purposes. This is so old a story that it seems idle to repeat it, and yet in all our large cities, especially in the East, we keep on adding year after year to our inflammable districts, and in many of the large cities in this country the greatest proportion of yearly growth is of this class of buildings which are a positive menace to the well-being of the community as a whole. This is purely and simply a case of selfishness. There is no more reason why a private citizen should be allowed to build a tinder box which may in the near future be a menace to a neighbor than that he should be allowed to maintain any other public nuisance. So long as private greed alone is to be considered, cheap construction will be the rule. A wooden tenement house, for instance, will frequently pay ten to fourteen per cent if constructed in the cheapest possible manner, while the same accommodation in a properly built, reasonably fire-resisting structure would imply an investment upon which the same rentals would give returns probably not over five or six per cent, but that is surely no reason why our communities should be exposed to such loss as is represented by the Paterson fire, and the public has a perfect right to demand that if people are to live in a city and enjoy the advantages thereof they shall be compelled to contribute towards the well-being of that city by using nothing but the right construction, even though that construction shall involve a lessening of return on their capital.

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THE fact that proper constructions reduce the rate of dividends is no argument in favor of fire traps. Good sewerage, efficient water supply, sanitary surroundings, all these also reduce the earning capacity of the land, but no one would for a moment argue therefrom that the individual should have a right to neglect these considerations. If we are to be free from conflagration we simply must appreciate that it will be cheaper in the long run to pay the bills in advance by constructing our buildings properly than to wait until the whole property is destroyed and then face the results which follow in the wake of every conflagration. The poor construction, with its high rate of return, is cheaper and more profitable only for the passing time. In the long run the better constructions would be by all odds the most economical if carried out systematically and if neighborhoods as well as individual buildings were constructed properly. The truth of this is admirably shown by the report which has been issued by Mr. Edward Atkinson as president and treasurer of the Boston Manufacturers' Mutual Fire Insurance Company. During the past fifty-two years his company has received in premiums something over twenty-two million dollars and has paid in losses something over four million, returning the larger part of the remainder to the shareholders of the company as dividends. During the past year the premiums amounted to $1,151,000, while the losses were $47,343.74. The risks — for this company insures nothing but mill property — are extremely hazardous, notwithstanding the thorough manner with which the company has insisted upon the most improved forms of checking and combating incipient fires, and it would not be fair to compare the fire losses of this company with the risks of ordinary dwellings and commercial buildings. But notwithstanding this and very largely also because of the care which the company has exercised, if the fire losses in Boston alone had been on the same ratio as those of the Manufacturers' Mutual Company the entire loss would have been less than $150,000, while as a matter of fact they amount to ten times that sum. The point we would make is that if the builders were obliged in some way to use proper construction, even in the simplest kind of buildings, the initial cost, while greatly increased, would undoubtedly be more than offset by the actual saving in the reduction of fire damage.

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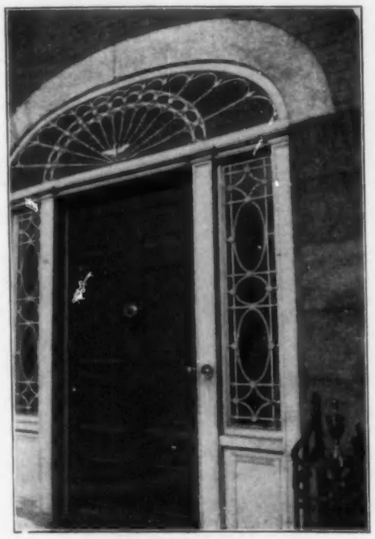
THIS brings us to the second point, the insurance companies. This is a subject we have often referred to in these columns. While the actual responsibility for conflagrations should properly be placed upon those who knowingly construct inflammable buildings in the midst of a city, a very considerable degree of moral responsibility rests with the insurance companies themselves. If the companies would unite in putting the rates so high on non-fire-proof buildings that it would be practically impossible or unprofitable to insure them at all, while the first result would be a tremendous falling off in the business of the insurance companies, there is no doubt that in the course of a very few years there would be an equilibrium established, as has resulted from similar action of the insurance companies towards mill construction. The losses to the companies in premiums would be more than made up by the reduction in fire losses, and individual owners no less than the community would in the long run be vastly the gainers by such a course of decided unequivocal action by the insurance companies. We confess to an amazement that the companies have not taken just such steps. If a net per cent premium were put upon every wooden house, even if erected slightly outside of what we choose to call the business center of a city, we would see very few wooden houses erected within the next ten years. This may sound drastic, but is nowhere near as much so as such a fire as that at Paterson, at Chicago in '71, or in Boston in '72. We believe insurance companies alone can bring this about. Municipal regulations will continue to be very largely a reflex of individual thought, and that individual thought will be always influenced very largely by immediate returns on investment rather than the public welfare. No one expects his particular house to burn down, therefore he is willing to take chances, even though those chances may involve a neighbor who is equally trustful of the future. Furthermore, the average lawmaker follows rather than leads public opinion and is very loath to interfere with what we might call vested right, though there is surely no more deeply vested right than one of self-protection against neighbors who willfully ignore the demands of good construction.

# Colonial Brickwork of New England. III.

## PROVIDENCE, R. I.

BY WALTER H. KILHAM.



DOORWAY, BENEFIT STREET, PROVIDENCE.

THE adaptation of Colonial architecture to hilly and broken sites is a phase of the situation that has not been generally considered. We are accustomed to thinking of Colonial buildings as standing four-square on level plots of ground such as are usually found in New England seaports. Such is the case with the houses of Salem, Portsmouth, Newburyport, and was to a great extent the case with Boston houses before the encroachments of business had caused their destruction. That this state of affairs is not a necessary accompaniment of the style is shown by the pictures which we present of the old brick architecture of Providence, R. I., where the old mansions stand as gracefully on the steeply sloping hillsides as they do elsewhere on level streets.

The residential part of the city of Providence is built for the most part on a high and steep hill which rises along the left bank of the river. North and South Main Streets run along the river bank directly at the foot of the slope, and are lined with old buildings, many of which have been altered for business purposes. Those on the western side of the street are of ordinary construction, but on the eastern side they are built against the hill and the principal rooms are placed upon what appears from the street to be the second floor. The main entrance is on this level, generally at the side, and is approached by a long flight of stone steps. The stables were at the rear, at a considerably higher elevation than the street. This type of house appears occasionally also on Benefit Street, which is parallel to Main Street and, being one block higher up the hill, has not yet been given over to business.

The most interesting of the old buildings now remaining on South Main Street is that occupied by the Providence Bank, a three-storied brick structure with a curiously curved roof and quite elaborate cornice. It is said that the building was built as a private residence and that the entrance, which now is at the street level, was originally *au premier* and was approached by a high double flight of steps. The interior is quite elaborately finished with an elegance rather unusual in New England. The panels of the wainscot are of varying patterns, and Corinthian columns and high mantelpieces with pediments and pilasters are much in evidence.

OLD COLONIAL HOUSE, PROVIDENCE.

Along Benefit Street, in the vicinity of the First Baptist Church, are some examples of a class of house not altogether peculiar to Providence. These houses stand on or near the street line and have porches or flush entrances giving access to the basement, whence a stairway leads to the main floors. Some of the basement windows have graceful grilles, one of which we illustrate.

It is on Benefit Street and the streets above that the

OLD COLONIAL HOUSE, PROVIDENCE.

OLD COLONIAL HOUSE, PROVIDENCE.

best work of Providence is to be found. Here the stately old mansions are surrounded in many cases by ample gardens, and, standing well back from the street, are approached by handsome gateways and flights of steps. The always rising ground necessitates in most cases a system of retaining walls, topped with high iron or wooden fences, through which a graceful gateway and staircase gives entrance to the front yard, which in many instances is treated as a flower garden. At one side, usually the upper side, a large gateway affords an approach to the stable yard, around which the stables and offices are built, forming a sort of court enclosed on

COLLEGE BUILDINGS, PROVIDENCE.

three sides, of which the grouping and architecture are scarcely less interesting than those of the house itself. In almost all cases the stables are connected with the house and form part of the same composition. These houses which stand in large plots of ground have the usual central porch with the Palladian window over it, which varies only in detail from those in other places. The semi-elliptical transom of the Palladian window is usually entirely filled with leaded glass instead of being partly filled with carved woodwork, as was frequently the case in other cities.

At the summit of the hill the buildings of Brown University include some interesting old brick dormitories, not unlike those at Harvard, but treated with greater simplicity.

The architectural history of Providence cannot be told without reference to the name of Joseph Brown, one of four brothers who during their lifetime were among the most prominent citizens of the city. Joseph Brown was born in 1733 and died in 1785. He was distinguished by his philosophical tastes and pursuits. He early retired from business with his brothers to devote himself to his favorite studies. Like MacIntyre of Salem and Bulfinch of Boston, he successfully followed other branches

OLD COLONIAL HOUSE, PROVIDENCE.

of art and science, as is shown by his observing the transit of Venus in 1769, having imported the necessary

OLD COLONIAL HOUSE, PROVIDENCE.

astronomical instruments. The memory of this feat is perpetuated in the name of Transit Street. With James

OLD COLONIAL HOUSE, PROVIDENCE.

Sumner, he was the architect of the First Baptist Church, erected in 1774–75, and known as one of the finest examples of Colonial architecture in New England. It follows

HOUSE ON BENEFIT STREET, PROVIDENCE.

in a general way the famous church of St. Martin's-in-the Fields, in London, the masterpiece of Gibbs. The building before referred to, occupied by the Providence Na-

HOUSE ON BENEFIT STREET, SHOWING SIDE ENTRANCE.

tional Bank, on South Main Street, was also designed by him in 1774 as his home. In association with Stephen Hopkins he designed and built the Market House on Market Square, now the Board of Trade building, of

A TYPICAL PROVIDENCE ENTRANCE.

which the corner stone was laid in 1773 by his brother Nicholas.

In 1786 he designed for his brother John the house

WINDOW GRILLE, BENEFIT STREET, PROVIDENCE.

on Power Street known as the Gammell house and now undergoing repairs for a new owner. This house is one of the finest and most historic in Providence.

OLD COLONIAL HOUSE, BENEFIT STREET, PROVIDENCE.

On either side of the broad sweep of the retaining wall are two weather-beaten statues, which, according to


OLD PROVIDENCE BANK.


STABLE YARD, PROVIDENCE.

an old-time fiction of the children of Providence, were supposed to revolve at the stroke of twelve on Saturdays. Their failure to do this was always explained to the groups of children who would gather by telling them that they mistook the hour. The solid brick walls and partitions of the house are made of bricks imported from England, and the doors, stair balusters, newels, rails, etc., are of solid San Domingo mahogany brought to Providence in Mr. Brown's own ships. The door pediments, the mantelpieces, the wainscots and deeply embrasured windows are all on a scale of unusual elaboration and elegance, and formed a fit setting to the many distinguished guests that were entertained in the house, among whom was no less a personage than General Washington, who on his memorable tour in 1789 lodged here and rode in the owner's coach. It was here that at an annual commencement dinner of Brown University, with many ministers present, Obadiah Brown, a relative of the owner, is said to have given the toast, "Here's a short respite to the damned in hell." All joined in the toast, the host leading off, saying, "Truly, gentlemen, a most admirable sentiment, in which we can all heartily join."


COLLEGE BUILDINGS, PROVIDENCE.

Unlike Salem and Portsmouth, Providence has become a large and busy city. The old houses in the lower part of the town are fast disappearing, but on the steep residential streets above the tide of business the architectural relics of the last century still hold their ground and promise to delight the eye for years to come.


STABLE YARD, PROVIDENCE.

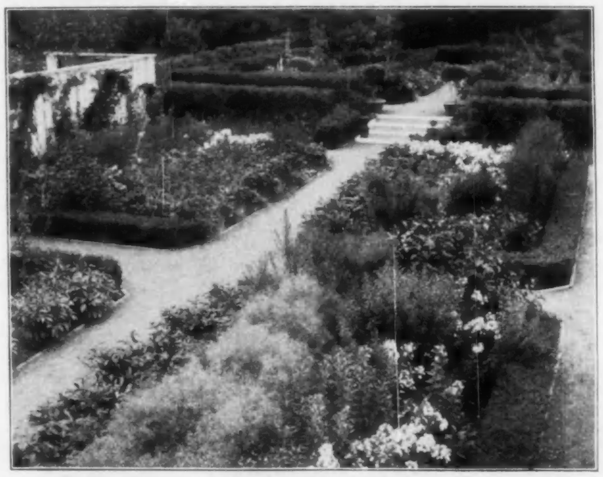

STABLE YARD, PROVIDENCE.

# Formal Gardens.

BY SAMUEL PARSONS, JR.

LORD BACON says truly that the enjoyment of a garden is indeed the purest of human pleasures, the greatest refreshment to the spirit of man, without which buildings and palaces are but gross handiworks.

And although we are unquestionably impressed with these sentiments, we are not unnaturally moved to inquire just wherein lie the true spirit and proportion of this garden, the presence of which is so necessary to the perfecting of buildings and palaces. Doubtless the explanation



GLIMPSE OF GARDEN NEAR BOSTON.
C. A. Platt, Architect.

will be found in the fact that a man's home, be it ever so princely or ever so humble, if it possesses real value, if it expresses anything of his character or needs, if it be in a word a true reflex of his spirit and not a mere toy or trophy of his pride, will be a creation so designed and arranged as exactly to fit its surroundings and circumstances.

Physical needs and comforts should be so yoked with nature herself in the garden as to allow the latter always to retain the primacy and continually to exert her own influence, which, if it is given free play, will become all-powerful and all-pervading and, instead of straining the natural senses with violent delights, will affect us like the sweet odors from heaven, affording unconscious and wholly pure refreshment to the spirits and heart of man.

The object of this paper is the presentation of some general considerations which should be borne in mind before the development of the practical details of landscape gardening is undertaken. And first we should remember that a man's home, if it is to be an expression of his own needs and taste, will be a place of many different features and occupations, and among these, extremely valuable as it is, the garden will make but a single integral part, with definite metes and bounds, occupying a position secondary to the whole.

The house has its own special area which will be necessarily treated in various ways in accordance with the needs and tastes of the tenant. The sharp winds to the north and west are to be taken into consideration, the preservation of attractive outlooks is highly important, and there are objectionable features that require to be relegated to the kitchen side of the house. The roads and walks must be tolerated because they are necessary; naturally we would prefer green grass and shrubs and trees to their bare surfaces. In a hundred ways we shall find our ideas of beauty continually bounded and limited by our ideas of usefulness. How indeed can any beauty be genuine unless it fits itself to the surroundings and carries with it the sane and homely sense of usefulness? Therefore the home domain should be a place of comfort and convenience as well as of beauty, not all a garden, though certainly all a picture, abounding in agreeable sights and sounds. And if a picture, it will be evident that a definite unity and due proportion should be secured in the disposition of the lawns, roads, groves and gardens, the stables, barns, meadows, and different appurtenances

GLIMPSE OF GARDEN NEAR BOSTON.
C. A. Platt, Architect.

and domestic appliances that help to make up the opportunities of country life.

It will be readily seen that these opportunities become more and more various as the exigencies of modern life continue to increase. Tennis and golf, the bicycle and automobile, demand accommodation, as well as the saddle horse and the hackney. Cattle and sheep may be desirable on meadow and hillside, and farm life may be

a feature to be accounted with. Fences and outbuildings of different shapes and forms and for different purposes will need to be designed and constructed. All these things and more may be accounted as part of the features of most country places, but while the garden is only one it is a most important one. Indeed it would be hard to overrate the æsthetic and useful value of the garden in the general economy of the country place; but it is only fair to the other features to place it in its due order and conjunction.

LANDSCAPE WITH GARDEN IN FOREGROUND.
HOME OF CHARLES A. PLATT, ESQ., WINDSOR, VT.

A distinct and well designed picture should evolve itself in the mind, as the unimproved territory and its possibilities spread themselves out before the eye, inviting the exercise of creative faculty in the making of a home. But this picture, if it is to be successfully evolved, should not be the hasty creation of an idle fancy or uninstructed imagination. It should grow slowly like most other good things. Laid out on a broad and simple plan, it should be inspired not alone by our own desires, but in good part by the suggestions of the shape and contour of the surface, the surrounding scenery and the character of the trees, rocks and soil.

BIT OF GARDEN WITH OPEN LANDSCAPE.
HOME OF CHARLES A. PLATT, ESQ., WINDSOR, VT.

It becomes evident from these considerations that the subject of the garden in any form should not be allowed to engross our attention before study has been given to the more general problem, — that of planning the arrangement of the entire country place or home territory, though it be no more than an acre in extent. Moreover it should not be expected that the details of such a scheme could be properly thought out in the beginning; nor would it be desirable, for room should always be left for the development of new ideas which will be sure to arise as the years go by and our natures and desires change.

But the main and dominant features should be early settled, — the position of the house, the extent and shape of the lawn, the main drive, the outlying or boundary plantations intended to limit and outline the house territory, the position of the garden, the stable and other important outbuildings.

To discuss the treatment of all features of the country place or suburban home does not naturally come within the scope of an essay on "Formal Gardens," but it is necessary to realize the distinct correlation that should be set up between these features of landscape architecture before we can approach the subject of gardens in a satisfactory way.

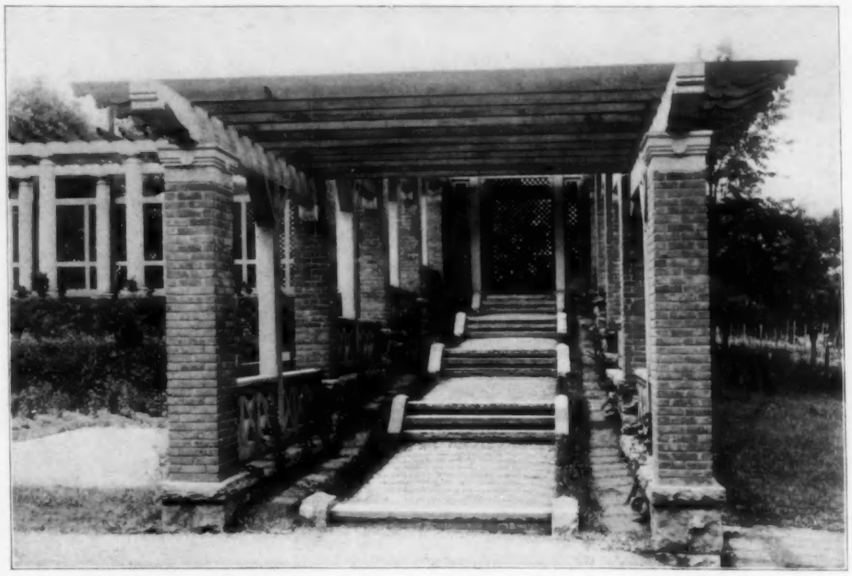
This broad and inclusive treatment of the garden together with other features of a country place has not assumed a definite form until within two centuries. The use of the term "landscape architecture" belongs perhaps only to the last century. Yet it would not be right to say that no good landscape gardening existed before the eighteenth century, when the present phase of nature worship in art and letters assumed dominant shape.

Many of the Italian, French and Elizabethan estates show now the remains of landscape gardening of an exceptionally fine type.

The charm of many of these old places lies in their entire unconsciousness, breadth and simplicity, and they are also devoid of the meretricious display and lavishness which characterize so much of the landscape gardening of the present day. Conglomerate masses of flowers, evergreens, trees and shrubs, chiefly box trees and rhododendrons, with a few bits of marble ravished from Italian ruins, can hardly be said to constitute a satisfactory garden.

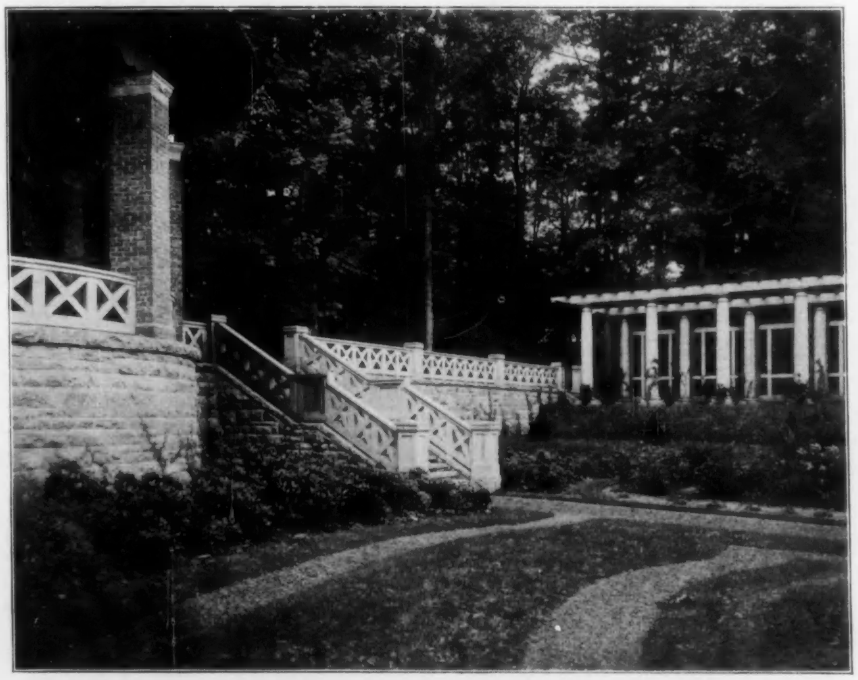
We do not know much of the gardens of ancient days, but they were probably formal arrangements of flowers and fruit trees, with a few evergreens and deciduous trees,

and beyond a wilderness. Of landscape gardening and park making of the modern type we find little evidence, although the love and awe of nature, if less varied and conscious, was doubtless as great as that of our time. The ancients had wonderful fruit trees and flower gardens and medicinal herb gardens, and combined with them the most remarkable effects of sculpture and architecture. But to-day on the hills of Italy, where, after all, everything new seems a continuation of the old, or else the old under a new name, we find little suggestion of a special liking for natural effects as we now understand them. Pan is there without doubt, and also the sacred groves of oaks and chestnuts, but the human highly sophisticated note strikes us everywhere. Even if we lose ourselves in the forest, we seem aware always of haunting echoes and glimpses of sculptured and living creatures, half stone, half human, yet wholly divine. Ancient sculptured gardens — for such they seem to be — come down the ages to us almost unchanged in their statues and marble steps and balustrades, their gleaming fountains and ilexes, yews and box trees, and if we are fortunate, "roses, roses everywhere." Yet we would not give up one touch of these moss-grown, weather-stained, often ruined heritages of time for all the glowing parterres and showy horticultural parades that appear in astonishing profusion on the modern millionaires' ornate and expensive lawns.



VIEW OF PERGOLA, HOME OF MRS. FREDERICK BELL, MADISON, N. J.
Parsons & Pentecost, Architects.

But while we are profoundly impressed with all the poetical charm, delicious melancholy and wholly delightful associations of the Italian villa or garden as it appears perched on the slopes of the Apennines, we feel, nevertheless, that this belongs to Italy and to another age when it was thought necessary to be always artificial. It would hardly do to assert that we are not artificial to-day, but it has grown to be a fashion, and perhaps a theory of life as well as of art, that we should aim to be more sane and natural than our fathers, or, at least, than the Italian nobles of the fifteenth century. It follows from this theory that our country places and recreation grounds should accept continual suggestions from the unsophisticated nature of our country. To transport an Italian garden of the fifteenth century to an American environment would be too much like putting nature in domino and mask to suit the sentiment of twentieth-century Americans.



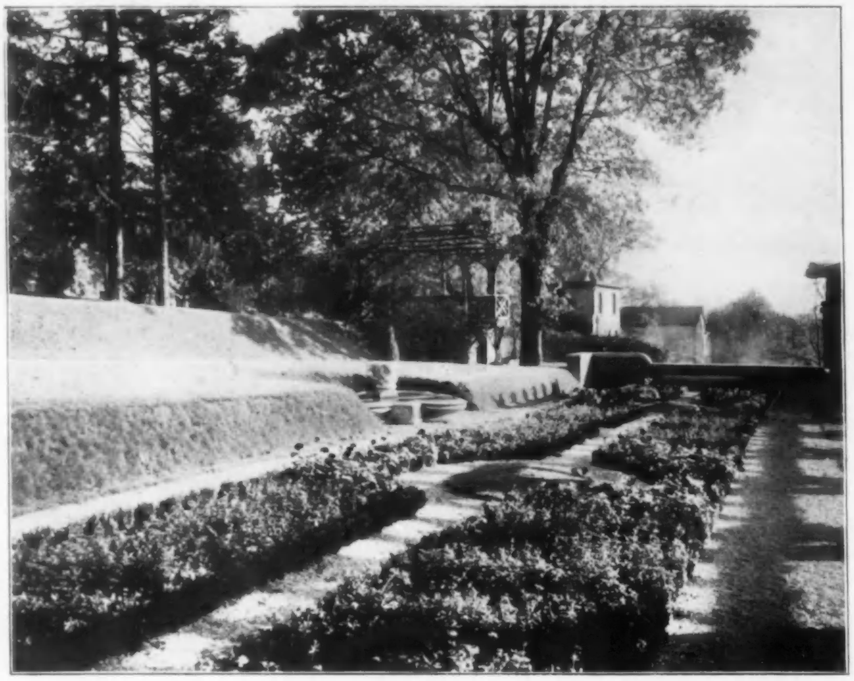
TEA HOUSE, BIT OF PERGOLA AND GARDEN, HOME OF MRS. FREDERICK BELL.
Parsons & Pentecost, Architects.

The reader may believe and undertake to show that we already have Italian gardens in this country, but it will be necessary in face of indubitable facts to controvert this pleasing but incorrect belief.

It is true we have gardens and good ones; but because marble steps, balustrades and fountains and fragments of marble imported from Italian ruins have been employed in their arrangement, we should not flatter ourselves that the Italian garden has actually reached our shores, with its old-time trees and flowers and its tender grace of moss-grown beauty.

Our gardens may be and are "things of beauty and joy," and they have been benefited by many suggestions that find their sources in foreign lands; but if these suggestions have been inspired by any instinct for sound and sane art they will check the impossible attempt to realize the Italian garden under the widely different conditions of American soil and climate; while on the other hand they will aid the American garden to develop itself under American conditions and to harmonize with the native climate, soil and surrounding scenery.

The American garden will be flanked and ornamented with arbors and pergolas made of native brick, terra-cotta and stone, wrought in all the beautiful designs that classic models enable us to produce, but nature will be encouraged to work her own will in well-ordered abandon, with roses, phloxes, sweet Williams, asters, junipers, yews and azaleas. For in spite of much fashionable classic aspiration, the Italian garden in America is a myth and will always remain a myth; for we cannot hope to attain even a far-away imitation of either its spirit or form.



VIEW OF DETAILS OF GARDEN FOR MRS. FREDERICK BELL, MADISON, N. J.
Parsons & Pentecost, Architects.

Turning therefore with respectful admiration from the gardens of other lands and days, we may gladly come back to the consideration of the garden of our own homes; not simply the garden with the house appended to it, but a separately embodied feature of the everyday economy and pleasure of home life.

Like the house, the situation of the garden needs to be selected with all due regard to the other features of the place. Very careful attention should be given to balance and proportion in its every relation to the home grounds, for it is in the just equilibrium of its various features that we shall find one of the chief charms of landscape art. Much study should be given to the successful blending of the lines of the garden and other divisions of the country place. Hard or inharmonious effects, startling contrasts and sudden violent transitions may be dealt with by melting, as it were, one distinctive feature of the place into the adjoining one by various devices of planting. Architectural divisions, such as walls, fences and steps, may be advisable or necessary, but in such cases the more or less

VIEW OF PERGOLA, HOME OF WILLIAM A. BUTLER, ESQ., YONKERS, N. Y.
Parsons & Pentecost, Architects.

rigid outlines should be softened and blended with neighboring effects by means of vines, shrubs and trees.

General rules can hardly be said to apply to the selection of a site for the flower garden, or, if you will, the formal garden,—a term used on account of the parallelograms, circles and ellipses that it makes use of,—further than the simple fundamental one that the surrounding features and home needs of every individual place should inspire and control the location of its various parts. One place may have its garden directly attached to the house and with most excellent effect, while another may be better placed a quarter of a mile away; and in like manner the materials of construction will vary in accordance with the peculiar needs and surroundings. Brick, terra-cotta, stucco and stone will be generally used to some extent in the construction of formal gardens, but it would be easy to imagine a place where all kinds of architectural work would only create a discord in the harmony, which, on the contrary, would be greatly enhanced and perfected by simple associations with trees and shrubs. Rules in the case of living beauty like that of trees and flowers are poor guides after all and are likely to fail one just at the moment when they are expected to prove especially useful.

DETAIL OF PERGOLA AND GARDEN FOR WILLIAM A. BUTLER, ESQ., YONKERS, N. Y.
Parsons & Pentecost, Architects.

The best method of laying out gardens, in the first place, is to depend on a few broad principles of design that will suit a large number of instances, but preparing ourselves to find the next gardening problem we meet entirely outside of our preconceived ideas and rules. Experience and many failures will eventually train one to undertake with some prospect of success the solution of such unfamiliar problems.

In the accompanying illustration, for instance, it will be readily seen that brick or stone commends itself for the uses to which it is turned, and that the secluded nook in the woodland just suits the formal garden, nestling as it does in a corner three hundred yards from the house and giving the feeling of retirement without loneliness by reason of its open, cheerful outlook over hillside and meadow.

DETAILS OF GARDEN FOR WILLIAM A. BUTLER, ESQ., YONKERS, N. Y.
Parsons & Pentecost, Architects.

So much for this particular garden; the next one may be different in every respect; but we shall hardly ever fail to find in all good examples of flower gardens such qualities as are expressed by the words *retiring, peaceful, harmonious, richly colored, sweetly scented, modest, dainty, finely proportioned and well balanced.*

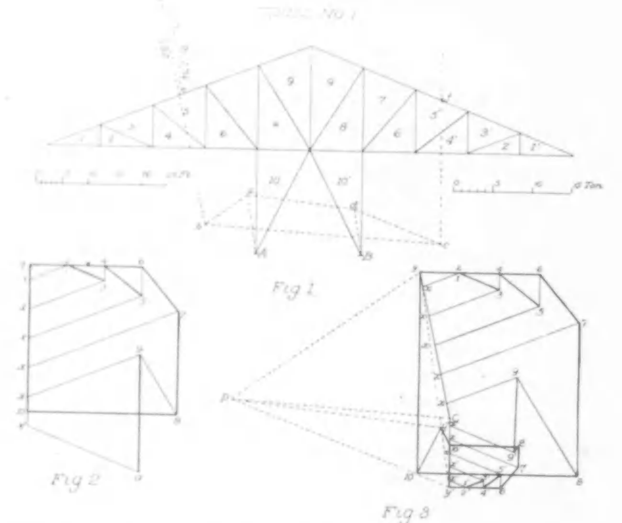
The beautiful garden, in a word, is one in which the opportunity given by nature has been perfected, not perverted, by the hand of living art.

# The Cantilever Arch Truss.

BY N. CLIFFORD RICKER, D. ARCH.

MANY railway stations have been built during recent years with their train sheds entirely open on three sides, instead of being enclosed by walls with wide openings for the passage of trains. The advantages of the open shed are obvious, for it is less costly and less liable to fire and other injuries. A terminal station usually has one end of the shed attached to the wall of the enclosed portion of the station containing offices and waiting rooms. For a through station the side of the shed is thus attached, or it may be entirely detached, only being connected with the waiting and baggage rooms by roofed platforms, likewise open at the sides.

For such a train shed, or even for any large enclosed hall, the balanced cantilever arch truss possesses many




advantages and merits careful study by architects and engineers. It has been employed but rarely, although a somewhat similar arch truss with three joints was used with great advantage in some of the larger buildings for the Columbian Exposition. The two examples of the cantilever arch truss best known to me occur in the Market House at Hanover, Germany, and in the Chicago station of the Illinois Central Railroad. It is possible that others have since been built in the United States.

A study of this form of truss soon revealed difficulties in applying the usual methods of Graphic Statics for stress diagrams, and a careful examination of all available publications on this subject failed to find any graphical solution for such a truss. A novel method was therefore devised which will probably be found interesting and useful in the study and design of this form of truss.

To simplify the problem, skylights and monitor roofs have been omitted in the example here worked out, although these are used in practice. The selected roof is of gable form, 100 feet span, 20 feet rise at center, and it is raised 20 feet clear above the floor. Trusses are of steel, placed 20 feet between centers, supporting steel I-purlins at each apex of principals, on which are fixed 2 x 6 pine rafters, set 2 feet centers. On these is laid ⅞-inch matched pine sheathing, covered with tin externally.

The maximum weight of snow is assumed to be 20 pounds per square foot of floor area. The maximum pressure of the wind on a vertical plane surface is taken at 40 pounds, making its normal pressure per square foot of the inclined surface of the roof 19.9 pounds by Hutton's Table.

The apex loads are computed in the usual manner, and it is also found that one 10-inch 25-pound I-beam will be required for each purlin supporting the rafters, weighing 500 pounds.

APEX LOADS.

| | |
|---|---|
| Permanent or dead, | 1.74 tons |
| Snow, | 2.00 " |
| Total P. & S. load, | 3.74 " |
| Wind pressure, | 2.14 " |
| Resultant of P. & W. loads, | 3.82 " |

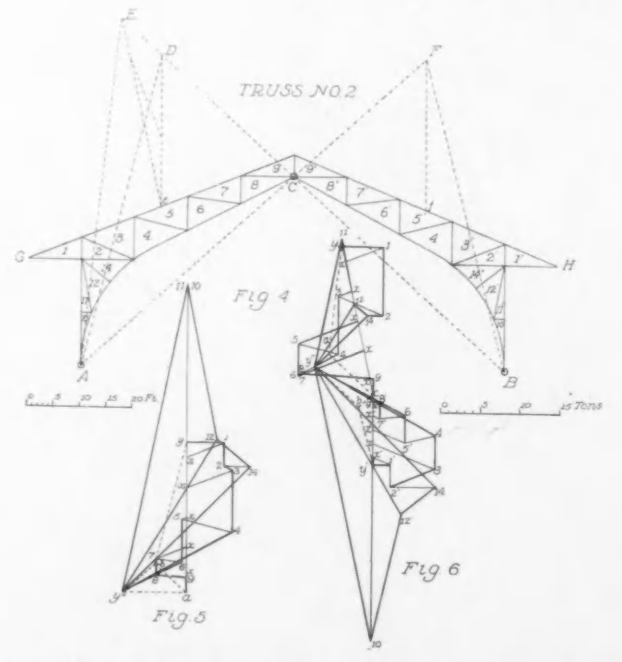
Since it is scarcely possible for the maximum snow load and wind pressure on the roof to occur together, the roof is studied under two conditions:

1. Supporting maximum permanent and snow loads on both slopes.
2. Supporting permanent load on both slopes and the maximum wind pressure on one side only.

The first condition usually produces the maximum stresses in the truss members, while the second shows whether these stresses are ever changed in character.

In order to make the method of treatment as clear as possible two somewhat similar types of trusses will be considered before taking up the balanced cantilever arch.

All truss and stress diagrams are drawn to uniform




scales for the three types of trusses so as to permit easy comparison.

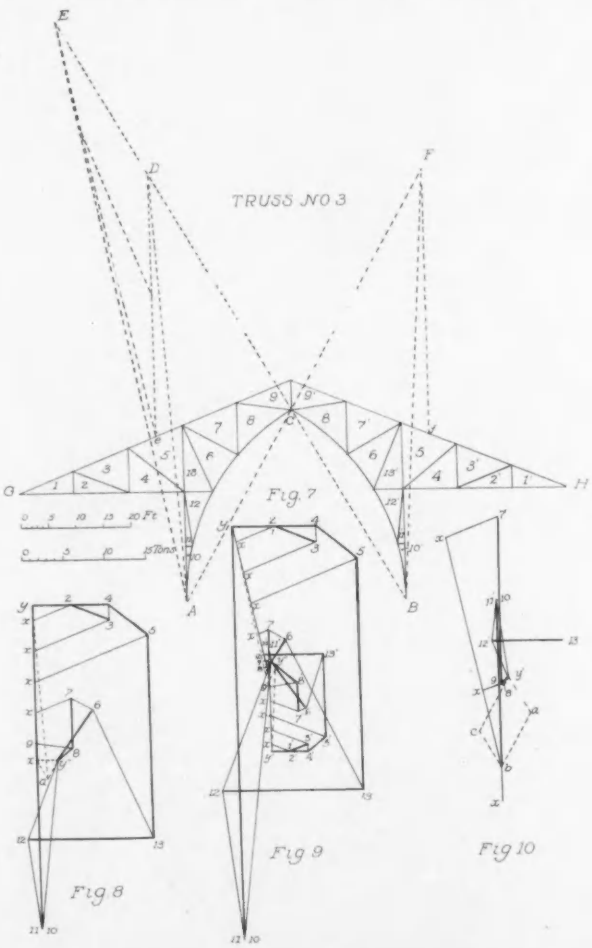
The system of notation used to indicate truss members designates the space on paper above the truss by *X*, that below it by *Y*; each triangle is numbered from the outer end of the truss. A member is then designated by the letter and figure, or by the two figures, denoting the surfaces separated by the member. The correspond-

ing stress line in the stress diagram will have the same letter or numerals at its ends.

Fig. 1 represents a truss supported by two columns 20 feet between centers, their feet being tied to the middle of the lower chord to prevent overthrow by the wind. This is a simple and novel truss, never used within my knowledge.

For convenience the half load from each side of the roof is assumed to act separately at the ridge apex. Then five equal permanent and snow loads are supported by the left-hand half of the truss and also by the footing $A$.

Draw the P. & S. diagram by laying off in Fig. 2 the vertical load line $y10$, dividing it into four loads and two half loads. No stress is found in the member 1 2. The diagram is drawn in the usual manner as far as point 7,




when it becomes necessary to commence again at the footing $A$, where the reaction is vertical and $= y10$, so that no stress occurs in the diagonal $y10$. Stress lines 10 8 and 7 8 are then drawn and the diagram completed for left side of truss as shown.

For P. & W. diagram assume the wind to act on left side of roof. With P. & W. loads on left and P. loads on right the reactions at footings $A$ and $B$ are neither equal nor vertical. The resultant of the P. & W. apex loads on left acts at $e$, while that of the P. loads on right is applied at $f$.

Make $yC$ and $Cy' =$ these resultants in Fig. 3, and divide as before. Join $yy'$ and draw in Fig. 1 $Aa$ and $Bd$ parallel thereto. Beginning at any point $a$ on $Aa$, draw equilibrium polygon $abcd$, obtaining the closing line $ad$, and draw $py''$ parallel thereto in Fig. 3, dividing the load line into the actual reactions at $A$ and $B$. The stress diagram for P. & W. loads is then commenced at left end as before. But a stress must exist now in the diagonal $y10$, since the reaction at $A$ is not vertical. In Fig. 3 draw $y10$ vertical and $y''10$ parallel to diagonal $y10$. Complete the diagram as before. The stress in vertical $y10' = y'10'$, and in diagonal $y10' = y''10'$. Points on right side of trusses are accented. Compression is denoted by heavy lines in all stress diagrams, tension by light lines.

This stress sheet shows stresses exceeding twenty-five tons in but two members, the vertical posts supporting the truss. The nature of the stress is changed in but two members, the diagonals from foundations to middle of lower chord.

STRESS SHEET FOR TRUSS NO. 1.

| Member. | P. & S. Loads. | P. & W. Loads. Windward. | P. & W. Loads. Leeward. | Maximum. | Minimum. | |
|---|---|---|---|---|---|---|
| $x1$ | + 5.1 | + 5.0 | + 2.4 | + 5.1 | + 2.4 | |
| $x3$ | + 10.2 | + 9.6 | + 4.7 | + 10.2 | + 4.7 | |
| $x5$ | + 15.3 | + 14.2 | + 7.1 | + 15.3 | + 7.1 | |
| $x7$ | + 20.3 | + 18.8 | + 9.6 | + 20.3 | + 9.6 | |
| $x9$ | + 15.3 | + 9.3 | + 9.1 | + 15.3 | + 9.1 | |
| $y2$ | − 4.7 | − 5.1 | − 2.2 | − 5.1 | − 2.2 | |
| $y4$ | − 9.5 | − 10.1 | − 4.4 | − 10.1 | − 4.4 | |
| $y6$ | − 14.2 | − 15.2 | − 6.6 | − 15.2 | − 6.6 | |
| $y10$ | − 18.7 | − 26.3 | − 5.0 | − 26.3 | − 5.0 | Vert. |
| $y10$ | 0.0 | + 6.7 | − 2.4 | + 6.7 | − 2.4 | Diag. |
| 1 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 3 4 | + 1.9 | + 2.0 | + 0.9 | + 2.0 | + 0.9 | |
| 5 6 | + 3.7 | + 4.1 | + 1.8 | + 4.1 | + 1.8 | |
| 7 8 | − 13.1 | − 20.3 | − 2.4 | − 20.3 | − 2.4 | |
| 2 3 | − 5.2 | − 5.5 | − 2.4 | − 5.5 | − 2.4 | |
| 4 5 | − 6.0 | − 6.6 | − 2.8 | − 6.6 | − 2.8 | |
| 6 7 | − 7.4 | − 7.9 | − 3.5 | − 7.9 | − 3.5 | |
| 8 9 | + 8.9 | + 15.3 | + 0.6 | + 15.3 | + 0.6 | |
| 9 9′ | − 15.1 | − 9.5 | − 9.5 | − 15.1 | − 9.5 | |

There are two members $y10$, one vertical, the other diagonal, both meeting at the joint $A$ or $B$.

Fig. 4 represents an arched truss with joints at each footing and at apex $C$ of the lower chord, the upper chord being separated at the ridge. There is a cantilever projection of 10 feet at each side.

Since the pressures produced at the pin $C$ by the loads on one half of the truss must be transmitted to the pin at the footing in a straight line, the equilibrium polygon cannot be used for determining the reactions at $A$ and $B$. Join $AC$ and $BC$ and prolong these lines. Intersect them by the lines of the resultants of the loads on the left and right sides at $E$, $D$, $F$. Join $AE$, $AD$, $BF$. Then, for example, the resultant of P. & S. loads on left side will act along the lines $DA$ and $DB$, etc.

For the P. & S. diagrams lay off and divide the load line $ya$ as before. Draw $yb$ parallel to $DA$, $ba$ parallel to $DB$, $ay''$ horizontal and $by''$ parallel to $AC$. Then $y''b =$ reaction at $A$ along line $AC$, and $by =$ reaction along line $AD$.

Commence at $y$ and draw stress lines $y1$ and $x1$.

Then begin at *A*, drawing stress lines $y''10$ and $y10$. Point 11 coincides with 10, since no stress occurs in member 10 11. After locating point 2 it will be more convenient to commence again at the ridge of the roof, where the half load is represented by $9a$ in Fig. 5, producing no stress in member $x9$. Draw 8 9 to intersect $y''8$, etc., completing the stress diagram.

The novelty of the method, then, consists in commencing the stress diagram at three different points instead of two, as for ordinary forms of trusses, checking its accuracy by the parallelism of the last stress line drawn to the corresponding member of the truss.

The P. & W. diagram in Fig. C is drawn in a similar manner. Draw the load line $yc$, $cy'$ and divide it. Resolve $yc$ into components $ya$ and $ac$, acting at *A* and *B*; $cy'$ into components $cb$ and $by'$, acting at the same points.

Draw $ay''$, $by''$ parallel to $bc$, $ca$, and $y''a$, $ay$ will be the required reactions at *A*; $y'b$, $by''$ those at *B*. The stress diagram is then drawn by commencing at *G*, *A*, *C* for left side, and *A*, *B*, *C* for right side.

Excepting for the two members joining at *A* the stresses in all members are much smaller than found for corresponding parts of the preceding truss, as clearly shown by comparing the stress diagrams.

The only stresses exceeding 25 tons are those of 38.3 tons compression in the two lowest curved members of the truss, but the stress reverses in nearly half the members. This is of no importance if the truss be made of rolled shapes riveted together at joints. Proper allowances must be made for curvature of members in fixing their dimensions.

STRESS SHEET FOR TRUSS NO. 2.

| Member. | P. & S. Loads. | P. & W. Loads. Windward. | P. & W. Loads. Leeward. | Maximum. | Minimum. | |
|---|---|---|---|---|---|---|
| $x1$ | + 4.9 | + 5.1 | + 2.4 | + 5.1 | + 2.4 | |
| $x3$ | + 5.8 | − 1.9 | + 8.6 | + 8.6 | − 1.9 | |
| $x5$ | − 1.1 | − 8.1 | + 4.2 | − 8.1 | + 4.2 | |
| $x7$ | − 4.5 | − 8.7 | + 0.8 | − 8.7 | + 0.8 | |
| $x9$ | 0.0 | + 0.5 | 0.0 | + 0.5 | 0.0 | |
| $y1$ | − 4.6 | − 5.1 | − 2.2 | − 5.1 | − 2.2 | |
| $y10$ | + 18.8 | + 1.1 | + 22.0 | + 22.0 | + 1.1 | Vert. |
| $y10$ | − 38.3 | − 16.7 | − 34.9 | − 38.3 | − 16.7 | Curved. |
| $y12$ | − 22.5 | − 9.8 | − 20.8 | − 22.5 | − 9.8 | |
| $y14$ | − 22.5 | − 9.9 | − 20.8 | − 22.5 | − 9.9 | |
| $y4$ | − 15.2 | − 3.5 | − 17.5 | − 17.5 | − 3.5 | |
| $y6$ | − 7.7 | + 2.3 | − 12.8 | − 12.8 | + 2.3 | |
| $y8$ | − 4.1 | + 2.1 | − 9.2 | − 9.2 | + 2.1 | |
| 1 2 | − 3.0 | − 8.5 | + 2.5 | − 8.5 | + 2.5 | |
| 3 4 | − 7.9 | − 7.3 | − 4.3 | − 7.9 | − 4.3 | |
| 5 6 | − 5.4 | − 4.0 | − 3.4 | − 5.4 | − 3.4 | |
| 7 8 | − 2.0 | + 0.2 | − 2.1 | − 2.1 | + 0.2 | |
| 9 9′ | − 1.9 | − 2.1 | − 0.9 | − 2.1 | − 0.9 | |
| 10 11 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 11 12 | − 18.7 | − 8.1 | − 16.6 | − 18.7 | − 8.1 | |
| 12 14 | − 5.7 | − 2.5 | − 4.2 | − 5.7 | − 2.5 | |
| 14 2 | + 3.7 | − 1.5 | − 5.2 | − 5.2 | + 3.7 | |
| 2 3 | − 1.0 | + 5.9 | − 6.1 | − 6.1 | + 5.9 | |
| 4 5 | + 6.7 | + 5.3 | + 4.1 | + 6.7 | + 4.1 | |
| 6 7 | + 3.2 | − 0.2 | + 3.2 | + 3.2 | − 0.2 | |
| 8 9 | − 4.2 | − 9.3 | + 0.8 | − 9.3 | + 0.8 | |

There are two members $y10$, one vertical and the other curved, both meeting at the joint *A* or *B*.

The balanced cantilever arch truss shown in Fig. 7 is evidently similar to that in Fig. 4, having pin joints at *A*, *B*, *C* and being divided at the ridge. The span of the equilateral arch is 40 feet and the side cantilevers overhang 30 feet each, so that each side nearly balances on the pin at its foot, producing very little pressure at *C*.

Since the vertical resultant $eD$ falls outside the lines of action of its components, *DH*, *DB*, the pressure on *A* exceeds the resultant and that on *B* becomes a pull from *B* towards *D*. Their magnitudes are found in Fig. 8 by drawing $ya$ and $xa$ parallel to *DH* and *DB*. Then making $xy''$ horizontal and $ay''$ parallel to *BD*, the reactions at *A* are $y''a$, $ay$, etc. Commencing at *G*, proceed as far as point 5; commence at *A* and determine 13; then beginning at ridge, locate 6. The stress line 6 13 must close parallel to member 6 13.

The resultant $eE$ of P. & W. loads on left side falls between its components *EA* and *AB*, producing a slight pressure on pin *C*. For clearness the middle portion of Fig. 9 is enlarged five times in Fig. 10. The line $cb$ represents the push on pin *C*, produced by the P. & S. loads on left side; $ba$ represents the pull on pin *C*, caused by P. loads on right side. The diagram is completed as in the last case.

The stresses in six members exceed twenty-five tons, those intersecting at *A* and *B* and in 5 13. Reversal of stress does not occur in any member.

STRESS SHEET FOR TRUSS NO. 3.

| Member. | P. & S. Loads. | P. & W. Loads. Windward. | P. & W. Loads. Leeward. | Maximum. | Minimum. | |
|---|---|---|---|---|---|---|
| $x1$ | + 5.0 | + 5.1 | + 2.4 | + 5.1 | + 2.4 | |
| $x3$ | + 10.1 | + 9.7 | + 4.7 | + 10.1 | + 4.7 | |
| $x5$ | + 15.2 | + 14.3 | + 7.1 | + 15.2 | + 7.1 | |
| $x7$ | + 4.6 | + 1.7 | + 3.3 | + 4.6 | + 1.7 | |
| $x9$ | 0.0 | + 0.4 | 0.0 | + 0.4 | 0.0 | |
| $y1$ | − 4.7 | − 5.0 | − 2.2 | − 5.0 | − 2.2 | |
| $y2$ | − 4.7 | − 5.0 | − 2.2 | − 5.0 | − 2.2 | |
| $y4$ | − 9.4 | − 10.3 | − 4.4 | − 10.3 | − 4.4 | |
| $y10$ | − 39.7 | − 49.5 | − 12.0 | − 49.5 | − 12.0 | Vert. |
| $y10$ | + 21.1 | + 33.1 | + 1.4 | + 33.1 | + 1.4 | Curved. |
| $y12$ | + 10.9 | + 17.0 | + 0.6 | + 17.0 | + 0.6 | |
| $y6$ | − 7.3 | − 3.9 | − 6.5 | − 7.3 | − 3.9 | |
| $y8$ | − 2.1 | − 0.2 | − 3.7 | − 3.7 | − 0.2 | |
| 1 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 3 4 | + 1.9 | + 2.0 | + 0.9 | + 2.0 | + 0.9 | |
| 5 13 | − 25.1 | − 28.5 | − 9.5 | − 28.5 | − 9.5 | |
| 7 8 | − 6.0 | − 4.2 | − 3.5 | − 6.0 | − 3.5 | |
| 9 9′ | − 1.9 | − 1.9 | − 0.9 | − 1.9 | − 0.9 | |
| 2 3 | − 5.0 | − 5.5 | − 2.3 | − 5.5 | − 2.3 | |
| 4 5 | − 6.0 | − 6.5 | − 2.8 | − 6.5 | − 2.8 | |
| 12 11 | + 11.0 | + 17.2 | + 0.8 | + 17.2 | + 0.8 | |
| 13 6 | + 17.5 | + 20.9 | + 6.4 | + 20.9 | + 6.4 | |
| 6 7 | + 3.1 | + 2.4 | + 1.1 | + 3.1 | + 2.4 | |
| 8 9 | + 4.3 | + 0.3 | + 3.1 | + 4.3 | + 0.3 | |
| 8 10 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |

There are two members $y10$, one vertical, the other curved, both meeting at the joint *A* or *B*.

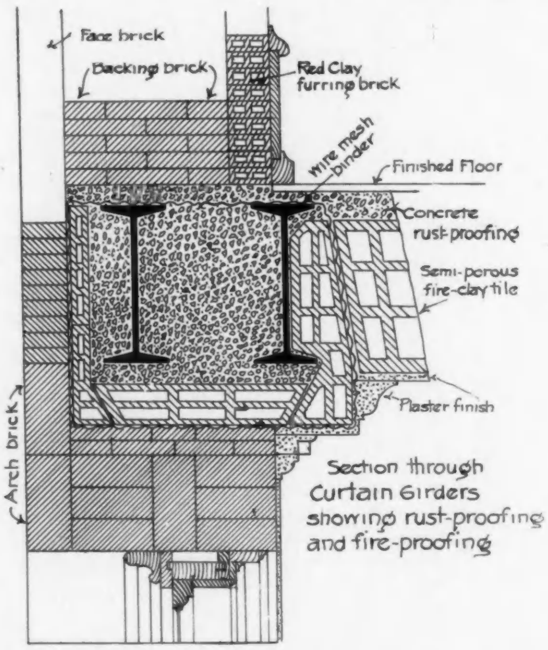
Therefore by proceeding in the manner indicated in this article the stresses in members of trusses of these types may be found as readily and accurately as for trusses of simpler and ordinary forms.

# Fire-proofing.

## RATIONAL METHODS OF FIRE-PROOFING.

BY WILLIAM COPELAND FURBER.

IN the construction of modern buildings with the enclosing walls carried entirely on a steel framework, the framework in the division or party walls is more vulnerable than that in the exterior or street walls if the building adjoining this party wall has wood floor construction. The spread of the flames and rapid combustion of such a building are greatly augmented by the hot gases that are confined by the high walls which act as a chimney and carry these gases to a great height. Under these circumstances, the party or division wall is subjected to an intense heat, sufficient sometimes to vitrify



Section through Curtain Girders showing rust-proofing and fire-proofing

the brick, and if the wall is carried on a metal framework it will be likely to collapse unless the framework is amply protected by a sufficient thickness of non-conducting covering, both fire-proof and non-vitrifiable. The ordinary hollow tile furring or thin partition block is not capable of protecting the iron work under such an exposure, and a special covering should be devised.

From a fire-proofing standpoint it would be much better to build the party wall solid from bottom to top, resting on its own foundation and independent of the framework, with the exception of the lateral ties which secure the two together. This gives the metal framework the advantage of the full thickness of the masonry wall from a fire on the adjoining side of the wall, but it does not dispense with the necessity of fire-proof covering against possible fire on the inside, which might arise from the combustion of the contents of the fire-proof building.

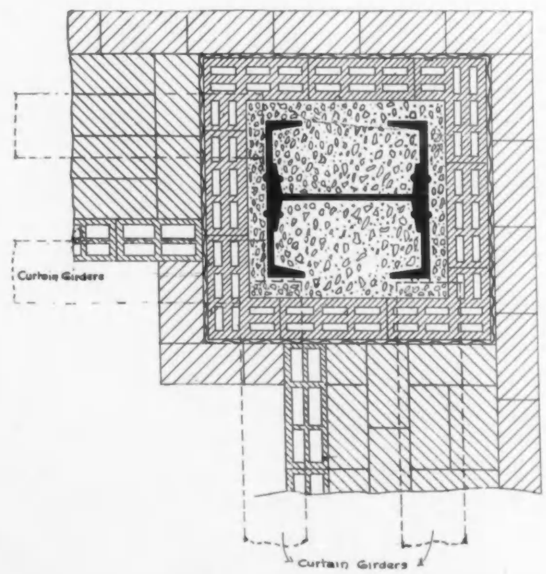
In the recent fire on Market Street, Philadelphia, the bricks in the party wall between the burning building and the non-combustible building to the east of it became so hot on the side toward the fire that when water was thrown on them they crumbled away to the depth of four inches. Had this wall been supported on an iron framework with the usual inadequate fire-proof covering, it would not have stood the trial to which it was subjected, and the non-combustible building on the east side of it would have collapsed, as this party wall was one of the supports for its single-span floor beams.

It is possible, however, to design the fire-proofing so that a division wall can be safely supported on iron framework if under certain conditions it seems desirable to build it so, but the question of the use of the solid party wall should not be negatively decided excepting under extraordinary circumstances. When these circumstances exist, the maximum temperatures that could result in case of fire must be considered and a covering designed to meet it which will resist the alternate action of fire and water without disintegration.

Porous hollow tile is undoubtedly the best material to use, for it can be heated to redness and then plunged into water without apparent disintegration; but it must be of sufficient thickness.

The use of the best materials, however, must be accompanied with sound constructional methods of attaching the covering to the steel members, or it will not endure the trial to which it may be subjected. Much remains to be done by the manufacturers of fire-proofing materials towards devising proper shapes and better methods of attaching them, and until this is done it is to be feared that a party or division wall should not be supported on an iron framework.

The manufacturers of fire-proofing materials owe it to themselves to improve their product, so that when a building is constructed with burnt clay coverings on a metal framework, its safety in case of fire is insured be-



Plan of external corner column

yond a question of doubt, and this cannot be until the coverings are made thick enough and of proper shape and form to permit a good job of setting to be easily made. It is also to the interest of the manufacturers, after they have provided proper materials, to see that the workmanship in setting it is of the best. A great deal of the so-called fire-proofing, particularly in columns, is

put on with a "dash" (of mortar) "and a promise," and should any slight mechanical injury happen to any part of it, the blocks above are likely to come tumbling down, leaving the columns exposed.

The manufacturers suffer for all this kind of work, because when a fire occurs in a building fire-proofed in this manner and serious injury or failure results, the cry is immediately raised that "fire-proof" buildings are not fire-proof, and it is therefore a waste of money to spend an extra amount to fire-proof them when they will be injured or destroyed in case of fire, and it is cheaper to pay the insurance companies to take the risk; whereas if the truth was known, the fault lay entirely in the particular method employed and not in the system.

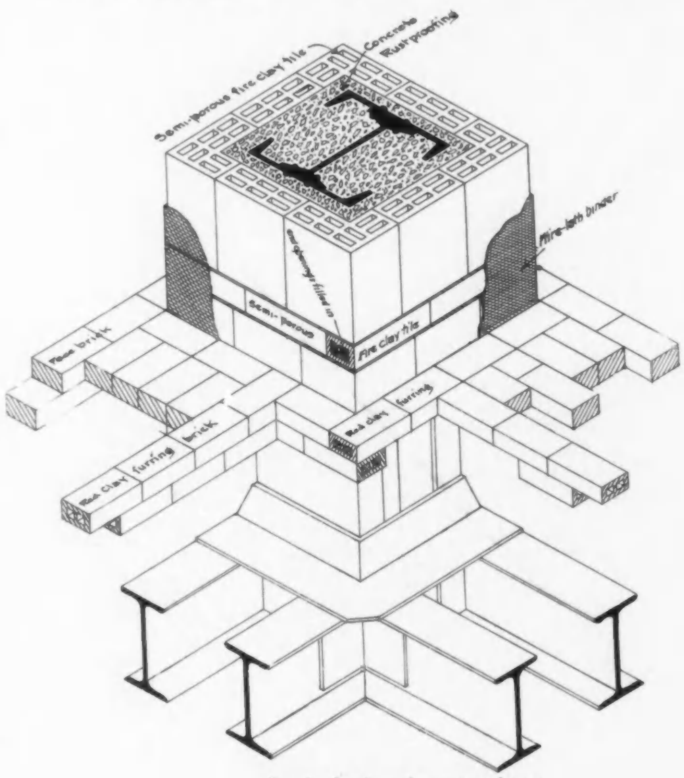
What the manufacturers need is the constant use of the testing laboratory and apparatus which should be a part of the essential equipment of every manufacturer. This equipment need not be a large one necessarily; an ordinary room with a furnace and fixtures and testing machines would serve very well, and this laboratory would be big enough to answer many questions. With such an equipment tests could be made on the transmission of heat, the resistance of materials to the action of fire and water, the weakening effect of heat on steel structural members, and the resistance of fire-proof coverings to mechanical injury. From these experiments data could be obtained which would place the whole matter on a scientific basis and remove it entirely from the domain of empiricism. Such experiments would not only give the facts required to convince the skeptical, but would also serve to convince manufacturers themselves that their product is actually worthy of serious consideration and that it could do what was claimed for it.

The Portland cement industry has been brought to a high state of development because its product has been required to pass certain tests of strength, of chemical composition, of manufacture, of fineness of grinding, etc., and as the cement improved in quality to meet these tests the requirements were raised. Manufacturers were therefore compelled constantly to be on the alert, not only to keep the product up to the requirements, but to be prepared to successfully meet the more exacting requirements which might be reasonably expected in the future. The study and investigation which were necessary in order to keep up with the specifications have been of invaluable benefit to the industry. Actual knowledge has taken the place of guesswork and mere opinion, so that to-day Portland cement is practically a fixed product of excellent qualities and deserves the high reputation it enjoys.

The burnt clay fire-proofing industry is greatly in need of the application of the same method. When the construction of buildings reaches a scientific basis and whims and opinions give way to facts and knowledge, then we can expect that specifications will call for fire-proofing to meet certain tests, such as degree of heat transmission within a given time per inch of thickness, resistance of the material to the disintegration under the alternate action of fire and water, resistance to breakage from mechanical injury, the shaping of blocks so as to discount poor workmanship in setting and permit the attachment of the material with the least labor, etc.

In the sketches accompanying this article an attempt is made to show how great an improvement can be made in fire-proofing columns and curtain girders on external walls by a better use of some of the present standard shapes of materials. These sketches are not put forth as suggesting ideal methods or even the best methods, but simply as a better method than those now commonly in use. An effort has also been made toward protecting the columns and beams in the external walls from corrosion by the use of a concrete envelope and filling. The use of Portland cement as a preventive of rust has already been explained and the chemistry of the subject touched upon in THE BRICKBUILDER for May, 1901, p. 98.

Another suggestion shown in the drawings is the metal lath binder around the terra-cotta tiles. This binder is an important detail of terra-cotta fire-proofing which is seldom, if ever, properly considered. Some




Detail of external corner column
Showing rustproofing and fireproofing and wire lath binder

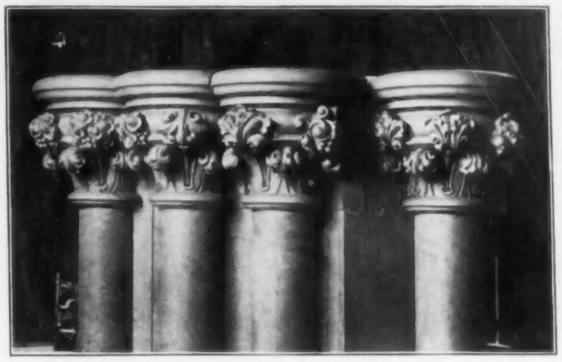
burnt clay material with thin walls is brittle, be it fine china or terra-cotta fire-proofing, and being brittle, it is likely to be broken. The wire cloth binder, if properly applied, serves to distribute the force of any blow, and if the blow be great enough to break the tile, prevents the broken piece from falling out and exposing the metal work beneath it.

If the manufacturers of fire clay materials will only take up this fire-proof question in their laboratories and study the subject in a theoretical and practical manner and find out the best shapes of tile covering that will answer to the fullest degree the purpose for which it is intended, and at the same time they are finding this out find out how to make these shapes in a commercial way, they will be doing themselves a great deal of good and also rendering a great service to the community.

# Selected Miscellany.

## Mosaics.

THE art of producing artistic designs by setting small pieces of stone, glass, burnt clay or other materials of different colors so as to produce the effect of a painting or a decorative effect by means of conventional patterns is a very old one, and its origin is lost in antiquity. We know that it was much practiced by the ancient Greeks and Romans, especially for ornamental pavements. Later under the Byzantine Empire, it was much used for the ornamentation of churches, in which it formed a large portion of the wall decorations. It was reintroduced into Italy for the same purpose about the middle of the thirteenth century. Since then it has been brought to such wonderful perfection that large pictures can be minutely imitated by it, although it may be questioned if this is the most artistic use to which mosaics may be put. Mosaics have been used since the time of the ancients whenever decorations were needed that would resist wear, destruction by the elements and the decay of time. Because of its enduring qualities it has been the medium of color decoration in monuments and monumental buildings, for the idea of endurance which underlies monumental structures requires that the same enduring principles must extend also to their decorations. From the number of such works which remain to us from all periods of history of this art under the various conditions of wear and exposure under widely different climatic influences, we are enabled to point to the material which out of the many used for mosaic work has withstood destructive influences the best.



CAPITALS BY C. B. J. SNYDER, ARCHITECT.
New York Architectural Terra-Cotta Company, Makers.

The material which has most singularly resisted abrasion and disintegration is hard burnt clay. The remains of the pavements of the atria and aulæ of the Roman houses in England and Germany have shown that mosaics of burnt clay tesseræ were neither worn away by the treading of the feet nor disintegrated by the action of frosts, as were all those made from natural stones. The celebrated tile friezes of the Assyrians at Babylon and Susa, the wall tiles from the burial vaults of the Etruscans, are monuments to the permanent beauty and indestructibility of ceramic decorations, and like the pottery vases of the Greeks were unaffected by time and exposure amidst the crumbling and decaying marble and granite structures in which they were placed. It has been proven that in much frequented places, under the activity of modern intercourse, floors of wood, marble and cement, or composition pavements made of broken mar-

"WYNDHURST," HOUSE OF JOHN SLOANE, ESQ., LENOX, MASS.
Peabody & Stearns, Architects.

CAPITAL BY M. L. ENDICOTT, ARCHITECT.
New Jersey Terra-Cotta Company, Makers.

APARTMENT, AMSTERDAM AVENUE, NEW YORK CITY.
Neville & Bagge, Architects.
Built of Gray Roman Brick made by the Ohio Mining and Manufacturing Company.

ble and cement, soon become unsightly. The mosaics of colored marble set in cement, while resisting the wear of the Roman sandals, do not stand the severe and rough wear of the modern shoes with their metallic heel nails. Marble mosaics for a short time are more glossy on the surface than ceramic mosaic and for that reason may be thought preferable, but this appearance is due merely to the polishing produced by grinding the marble down to an even surface after it has been set in position, its face afterwards being coated with wax or oil; but the wax soon wears off and the oil collects dust, thus obscuring the design. The rubbing down reduces the particles of marble to a very thin shell, and when subjected to the wear of traffic the marble assumes an uneven surface and as it wears the joints become larger. Marble mosaic being cut with the blow of a hammer, the top is larger than the bottom. Expansion and contraction soon make large unsightly cracks in marble mosaic work, the reason being that marble is of a limestone formation and is much softer than Portland cement.

Marble mosaic to hold its position must be set in Portland cement, and as soon as the cement begins to expand the floor either cracks in the joints or more frequently straight across the marble itself, not only making the finished work unsightly but difficult and very expensive to repair. Ceramic mosaic is set at once with an even surface and cannot afterwards be ground down by rubbing, the material being too hard to be affected by any grinding which is employed on marble mosaic. It begins to polish the first time it is washed, and looks brighter and cleaner after every subsequent washing, gradually acquiring the face which is so pleasing when marble is new. This polish will not wear off, being preserved by the regular washing necessary to keep any floor clean.

Ceramic mosaic is incomparably harder than marble mosaic, which can be proven easily by rubbing a piece of each of the two kinds together. The soft marble will grind away while the ceramic product remains unaffected. All of the varieties of color in marble are produced in ceramic mosaic, besides hundreds of other shades not found in the natural stone. Because of a peculiar quality in hard burnt clay, which may be described as a sort of toughened ceramic mosaic, when set in Portland cement it forms a durable covering for floors or walls, is not sensitive to brittleness, and being non-porous it has no superior as a sanitary article.

Glass mosaics will not last on floors. Owing to the extreme brittleness of glass the pieces used very quickly become chipped around the edges, thus widening the joints in an objectionable manner, a greater portion of the cement becoming visible where not intended, thus marring the design. The substance of which glass mosaic is formed is not solid, but contains small, flat, spherical air-holes, each increasing in size by chipping, just as do the edges of the pieces, thus affecting the color, and soon the floor assumes a dull and dead appearance.

A word about the setting of tiles and ceramic mosaics. Much prejudice and dissatisfaction has been caused by trusting this class of work to incompetent workmen (commonly Italian marble mosaic layers) who know nothing about ceramic mosaic, as their education is entirely on marble mosaic.

Sometimes aided by poor and insufficient material

MISSION HOUSE, THIRTIETH STREET AND THIRD AVENUE, NEW YORK CITY.
Howells & Stokes, Architects.
Built of Speckled Roman Brick made by B. Kreischer & Sons.

DETAIL BY FRANK R. WATSON, ARCHITECT.
Conkling-Armstrong Terra-Cotta Company, Makers.

for setting same, many a beautiful tile floor has thus been permanently spoiled. Sometimes it is because a good workman is in too big a hurry and slights his work. Few realize that tile work, when rightly set, will outlast the building which it decorates.

UNIVERSITY SCHOOL FOR BOYS, BALTIMORE, MD.
Joseph Evans Sperry, Architect.

## GEORGE M. FISKE ELECTED PRESIDENT.

The annual convention of the National Brick Manufacturers' Association was held at Cleveland, February 12-15. The attendance was greater than at any time since the organization of the association, an unusually large number of the leading clay workers of the country being in attendance.

The whole thought and purpose of the association is for the advancement of the science of clay working. In addition to the usual number of excellent papers treating the various problems of manufacture, the convention was honored by the presence of Architect J. Milton Dyer of Cleveland, who read an interesting paper on "Brick in Architecture." The bringing together of the architect and the clay worker for the discussion of matters of common interest is a new feature which has been recently introduced by Secretary Randall of the association, and judged by the interest manifested in Mr. Dyer's paper the results will be of inestimable value to both.

Needless to say, every detail of arrangement for the care of the attending members was planned and executed, under the direction of Mr. William H. Hunt, the retiring president of the association and the general manager of the Cleveland Hydraulic Press Brick Company, in a manner which left nothing to be desired.

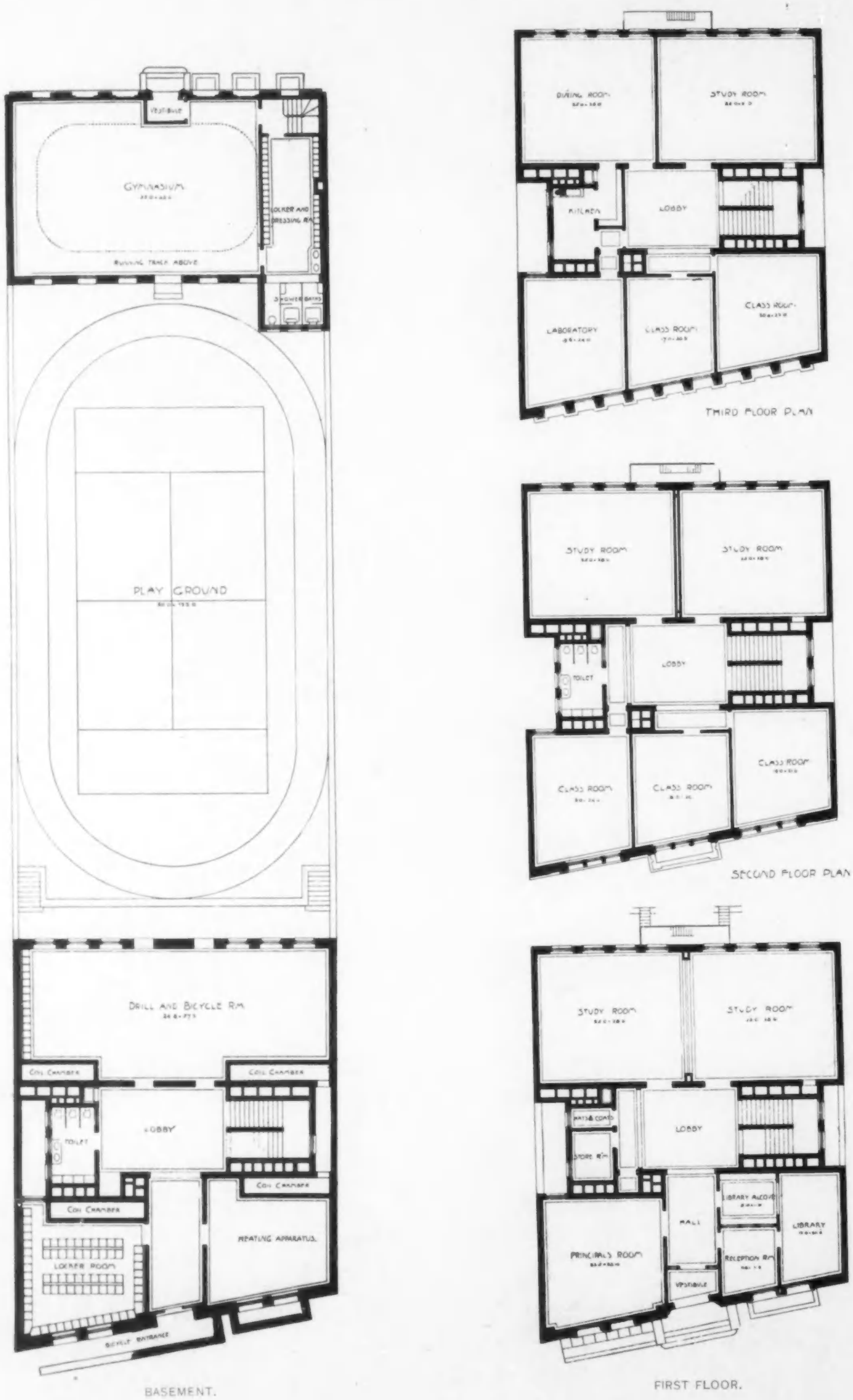
Mr. George M. Fiske of Boston was elected president of the association for the ensuing year. Mr. Fiske is the senior member of the firm of Fiske & Co., Boston, dealers in clay products of all kinds, and is numbered among the pioneers in the manufacture of front and ornamental brick, architectural terra-cotta and faience.

## NOTES FROM NEW YORK.

As shown by the annual report of the Building Department, the cost of building operations in New York City in 1901 was nearly double that of the previous year. The total estimated cost in the city, including new structures of all classes and alterations to old buildings, was $150,072,657. For 1900 the total was $88,462,174. There seems to be no reason for this great increase over 1900 other than the growth of the city and a generally prosperous condition in all branches of the building industry.

The effect of the tenement-house law, which went into effect last April, is shown in the report. It has

CAPITAL EXECUTED BY THE EXCELSIOR TERRA-COTTA COMPANY.



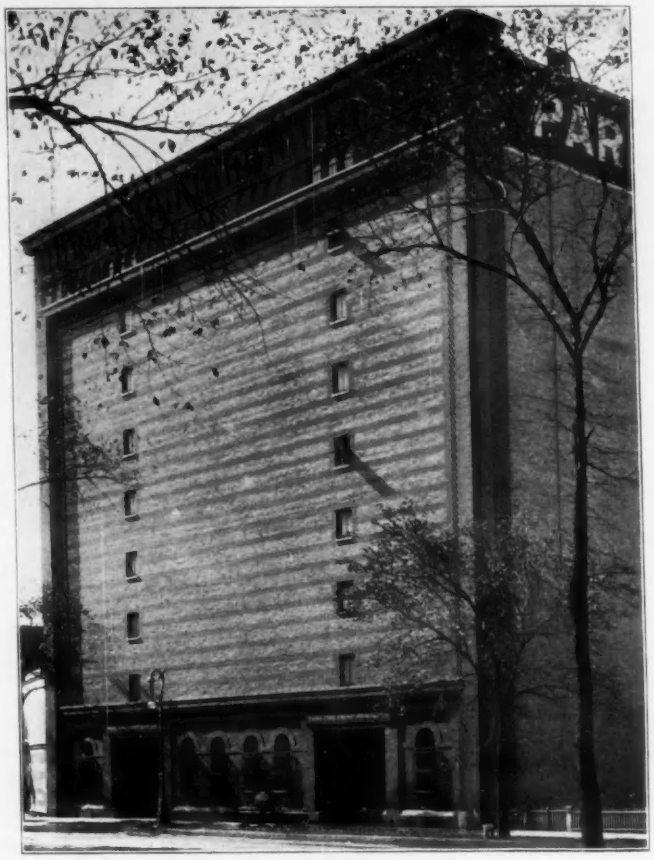

PLAN, UNIVERSITY SCHOOL FOR BOYS, BALTIMORE, MD.

Joseph Evans Sperry, Architect.

greatly decreased the number of brick tenement houses and increased the number of frame dwelling houses and smaller family apartments.

One of the greatest merits of the present reform administration is the enforcing of all existing laws whether good or bad. Among the wise laws which have been absolutely disregarded is the one prohibiting persons from standing in the aisles and back of the seats in the theaters. Heretofore there has been no limit to the number of people who could be packed into our theaters, and it is terrible to think what might have happened in case of fire or panic in spite of the fact that most of our theaters have ample exits. The enforcement of this law has the approval of the general public.

Another matter which has endeared our present administration to the intelligent public as well as to the artistic class is their evident desire to coöperate in any attempt to beautify or improve the appearance of the city. The Municipal Art Society, which was organized with this idea in view, is for the first time recognized as a body of experts whose suggestions are of great value to the city.



STORAGE WAREHOUSE, CHICAGO.
Holabird & Roche, Architects.

As a beginning, the matter of street signs and lamp posts is now having serious consideration, and it will not be long before we will notice the improvement.

Among more costly improvements suggested are the public forum at Union Square, the raising of the Columbus monument and general improvement of the "Circle" at Fifty-ninth Street, the water gate and monument at Seventy-second Street.

The League exhibition is now opened and is a thoroughly fine one. The hanging committee are to be especially congratulated upon the pleasing arrangement of the pictures, as well as the decorations and sculpture.

Contracts have been signed with the Hecla Iron Works of Brooklyn for bronze marquises and other exterior decorations costing $300,000, for the new hotel which Colonel John Jacob Astor is building at a cost of $2,000,000 at the corner of Fifth Avenue and Fifty-fifth Street. This hotel will be a beautiful structure of the best type and will be completed by next September.

## IN GENERAL.

The architectural terra-cotta with which the fronts of the Case and Advance Thresher Company buildings at Minneapolis were embellished was furnished by the Winkle Terra-Cotta Company of St. Louis. The illustrations appear in the plate form of this number.

The Keith Company, architects, Minneapolis, Minn., are desirous of securing two or three competent architectural draughtsmen at once. Permanent positions are offered good men.

The catalogues of the architectural exhibitions given by the T-Square Club of Philadelphia are always interesting, and especially so is the one for this year. It includes an unusually large number of well-chosen illustrations, besides other matter which will be of interest generally to architects.

At the regular monthly meeting of the New York Chapter, A. I. A., held on the evening of February 13 there was considered an important proposition from the Fine Arts Federation to present to the legislature a bill to facilitate the selection of competent architects for municipal buildings of the city of New York.

Raymond F. Almirall, architect, New York City, announces the removal of his offices from 10 East Twenty-third Street to 51 Chambers Street.

Messrs. Sutter & Putnam, 44 Louis Block, Dayton, Ohio, announce that they have resumed an active business association for the practice of architecture.

DETAILS FOR NEW THEATER, BOSTON.
John Galen Howard and James M. Wood, Architects.
Atlantic Terra-Cotta Company, Makers.

Clarence A. Neff, formerly of the firm of Dwyer & Neff, and Thomas P. Thompson, Norfolk, Va., have formed a copartnership for the practice of architecture under the firm name of Neff & Thompson.

"Love's Dream" is the title of a very beautiful calendar which is issued by the Reese-Hammond Fire Brick Company of Boliver, Pa., one of which we have the good fortune to possess.

Fiske & Co., Boston, will supply brick for the following new buildings: House of Correction, Boston Harbor, A. Warren Gould, architect; residence, Brookline, Mass., Little & Brown, architects; municipal building, Dorchester, Mass., William H. Beserick, architect; business block, Deal Beach, N. J., Buchman & Fox, architects; office building, New York City, F. L. Ellingwood, architect; public school, New York City, C. B. J. Snyder, architect; two public schools, Brooklyn, N. Y., C. B. J. Snyder, architect; St. Paul Episcopal School, Concord, N. H., Henry Vaughn, architect; Hospital for Consumptives, Rutland, Mass., Kendall, Taylor & Stevens, architects; Children's Hospital, Boston Harbor, Charles Brigham, architect; Majestic Theater, Boston, Mass., Wood & Howard, architects; Y. M. C. A. Building, Fall River, Mass., Nat. C. Smith, architect; Boys' Club, Pawtucket, R. I., Stone, Carpenter & Willson, architects; office building, Pawtucket, R. I., Stone, Carpenter & Willson, architects; Colonial Trust Building, Waterbury, Conn., Davis & Brooks, architects; high school, New Haven, Conn., Brown & Von Beren, architects; Y. M. C. A. Building, New Haven, Conn., Brown & Von Beren, architects; grammar school, Springfield, Mass., E. C. & G. C. Gardner, architects.

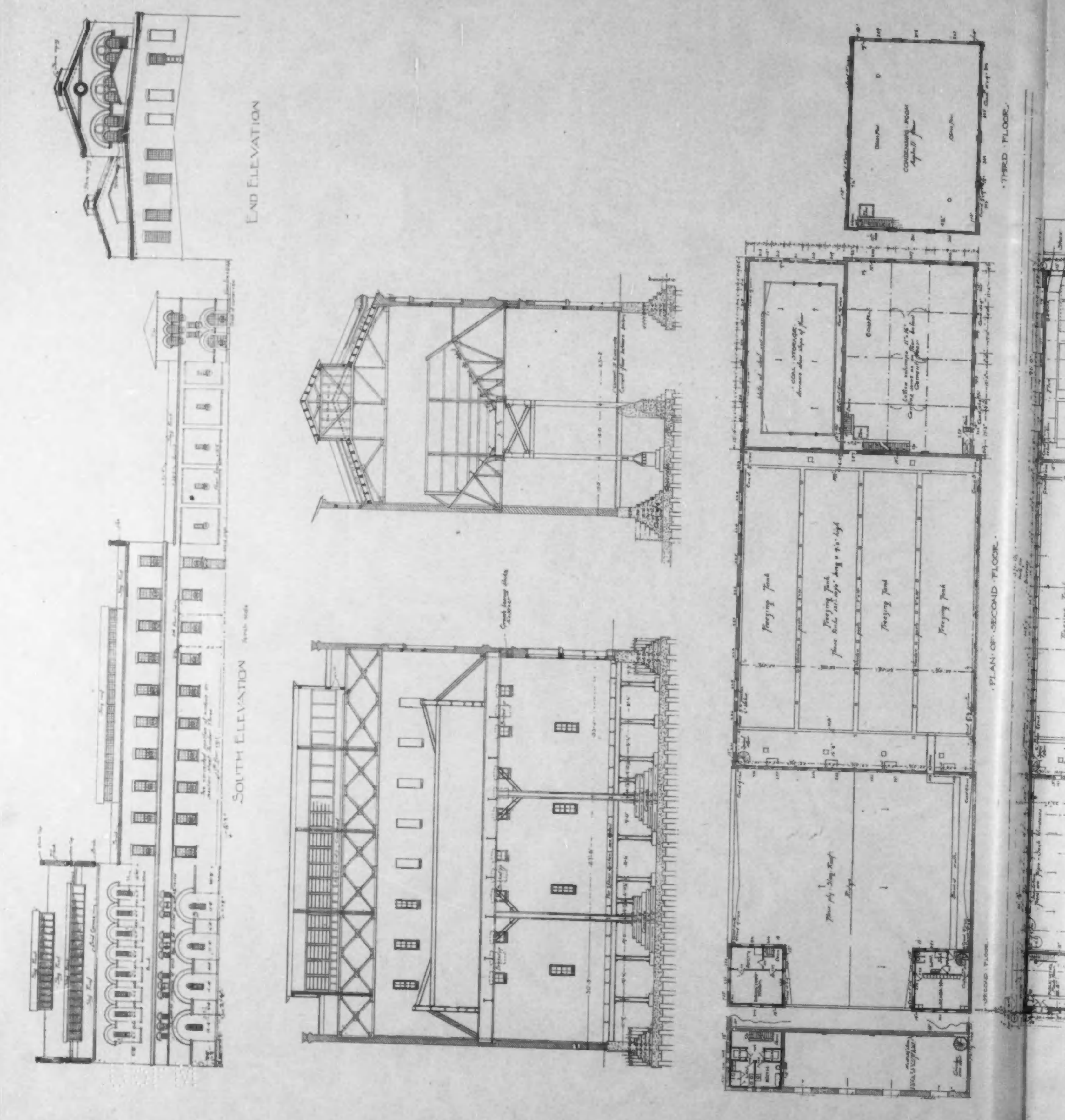
DETAIL BY D. H. BURNHAM & CO., ARCHITECTS.
Northwestern Terra-Cotta Company, Makers.

DETAIL BY BENES & HUBBELL, ARCHITECTS.
Perth Amboy Terra-Cotta Company, Makers.

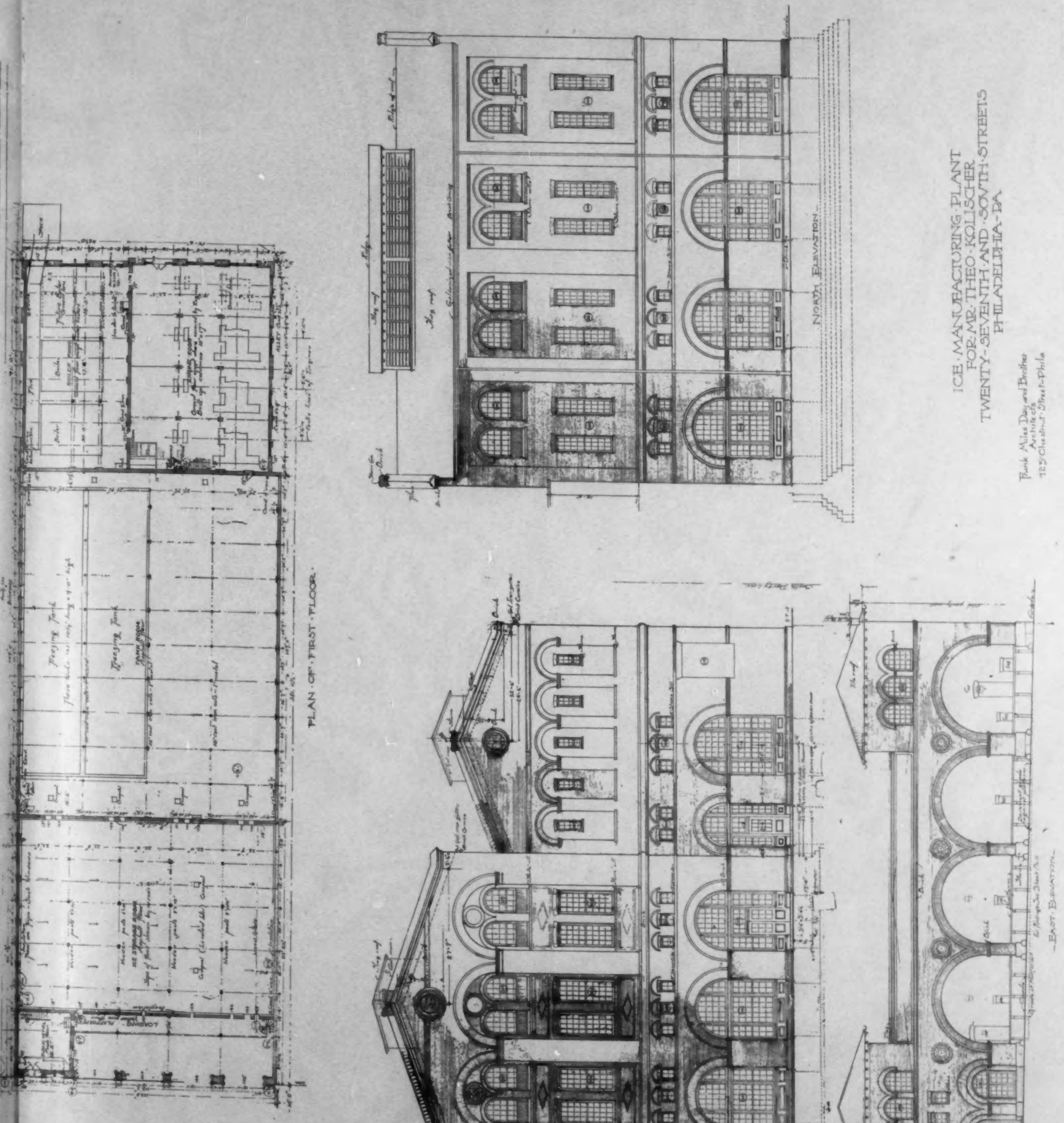
DETAIL BY R. M. MILLIGAN, ARCHITECT.
St. Louis Terra-Cotta Company, Makers.

## MANUFACTURERS' CATALOGUES AND SAMPLES WANTED.

The following named architects would be glad to have manufacturers' catalogues and samples sent them: Broderick & Wade, Union Trust Building, St. Louis, Mo.; Rose & Eken, Columbia Building, Norfolk, Va.; Neff & Thompson, Columbia Building, Norfolk, Va.; Edwy E. Benedict, 43 East Main Street, Waterbury, Conn.; Adolph Mertin, 33 Union Square, New York City; Walter E. Pinkham, 511 Strangenwald Building, Honolulu, Hawaiian Isles.


END ELEVATION
SOUTH ELEVATION
COAL STORAGE
CONDENSING ROOM
Freezing Tank
Freezing Tank
Freezing Tank
Freezing Tank
THIRD FLOOR
PLAN OF SECOND FLOOR

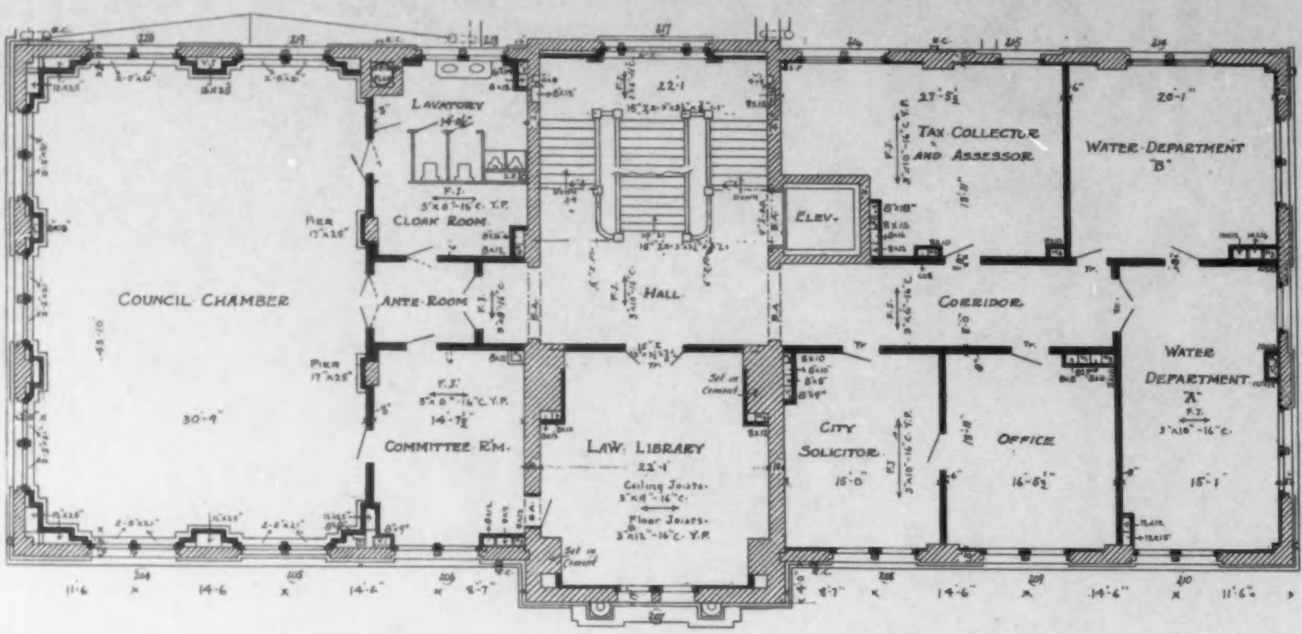
PLATES 9 and 16.



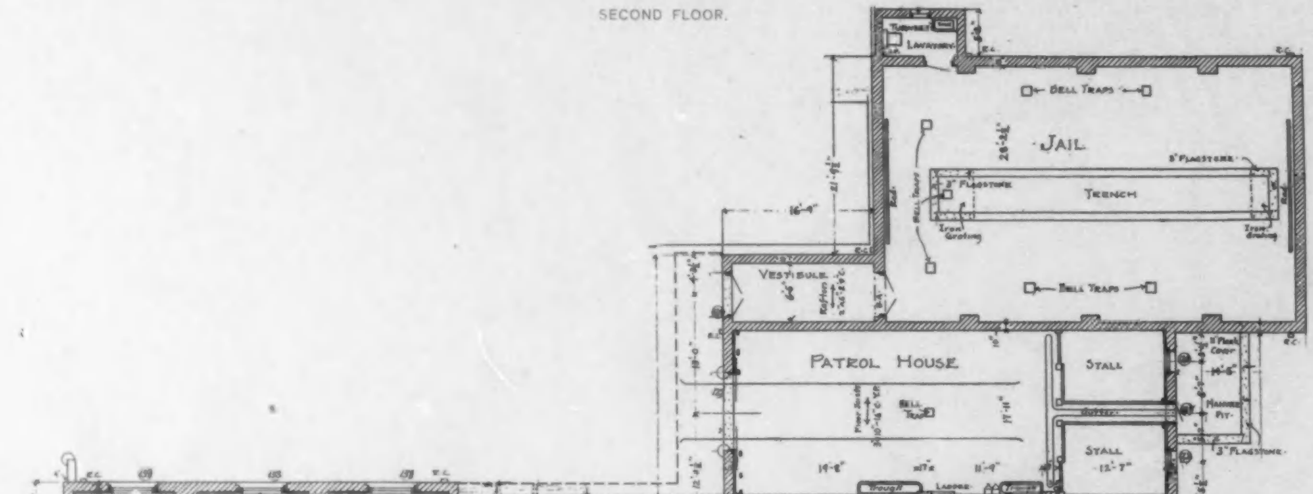

ICE-MANUFACTURING PLANT, PHILADELPHIA, PA.

FRANK MILES DAY & BROTHER, ARCHITECTS.

VOL. 11. NO. 2. PLATE 10.



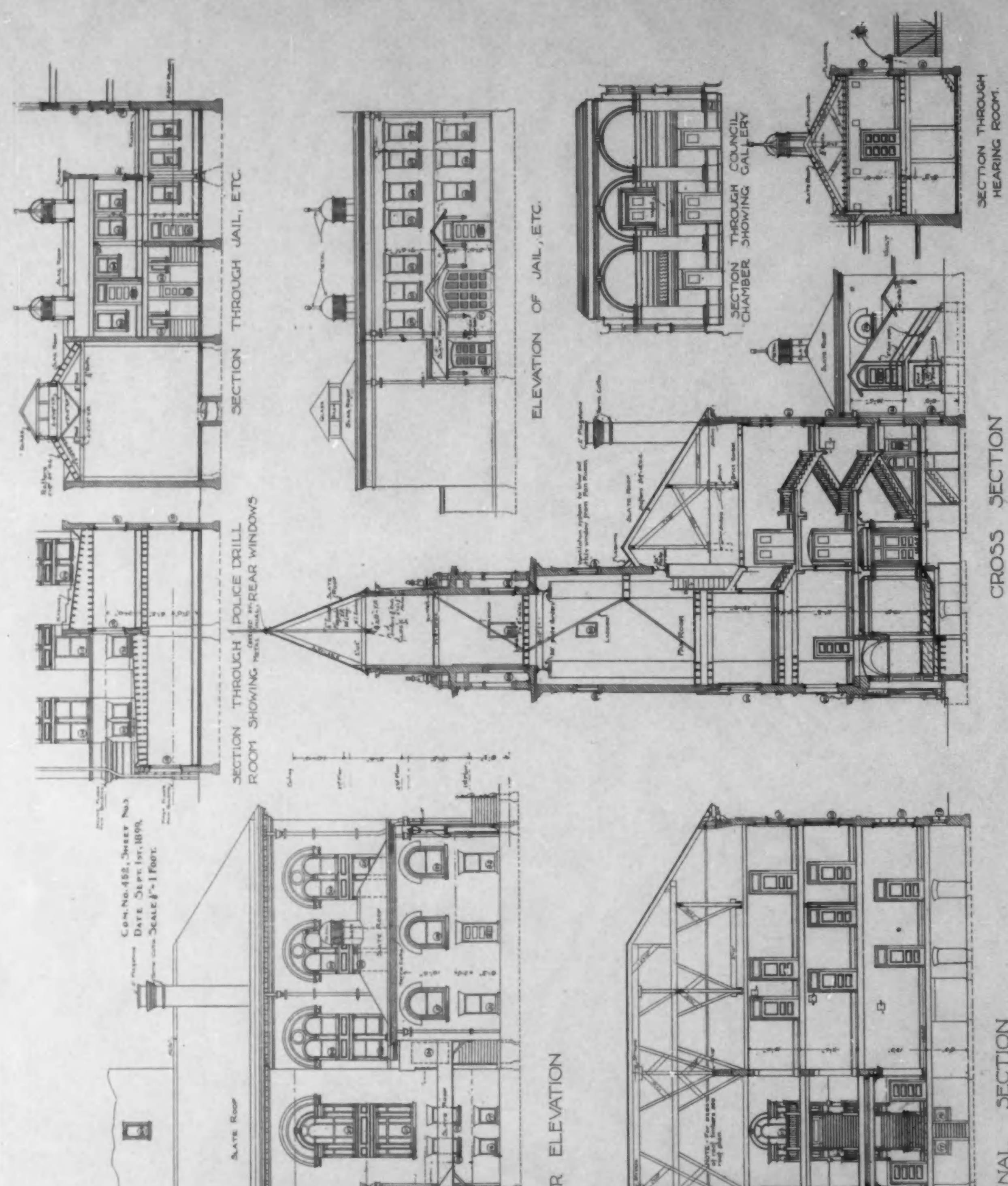

SECOND FLOOR.




FIRST FLOOR.

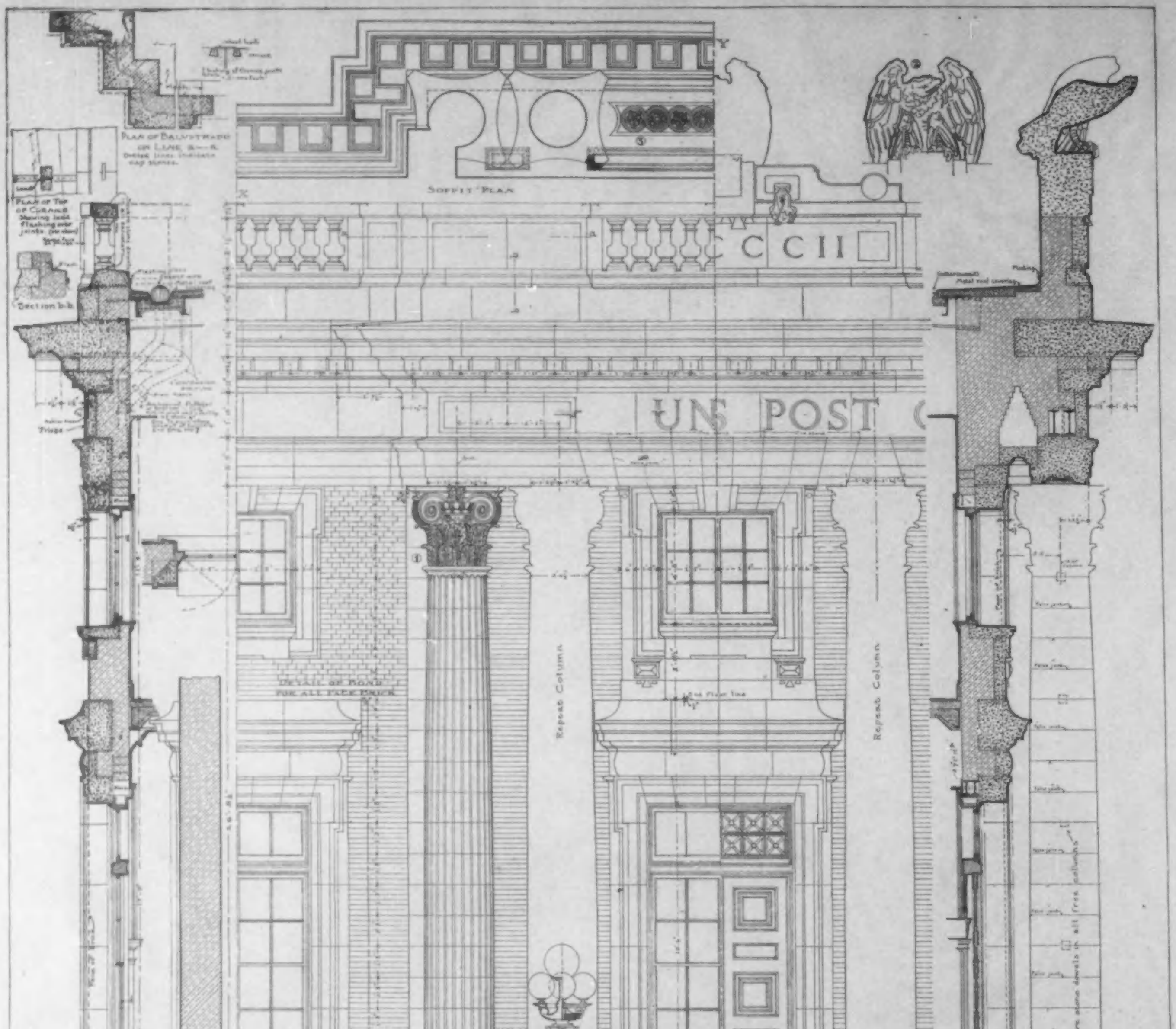
A NEW CITY HALL.

COPE & STEWARDSON, ARCHITECTS.



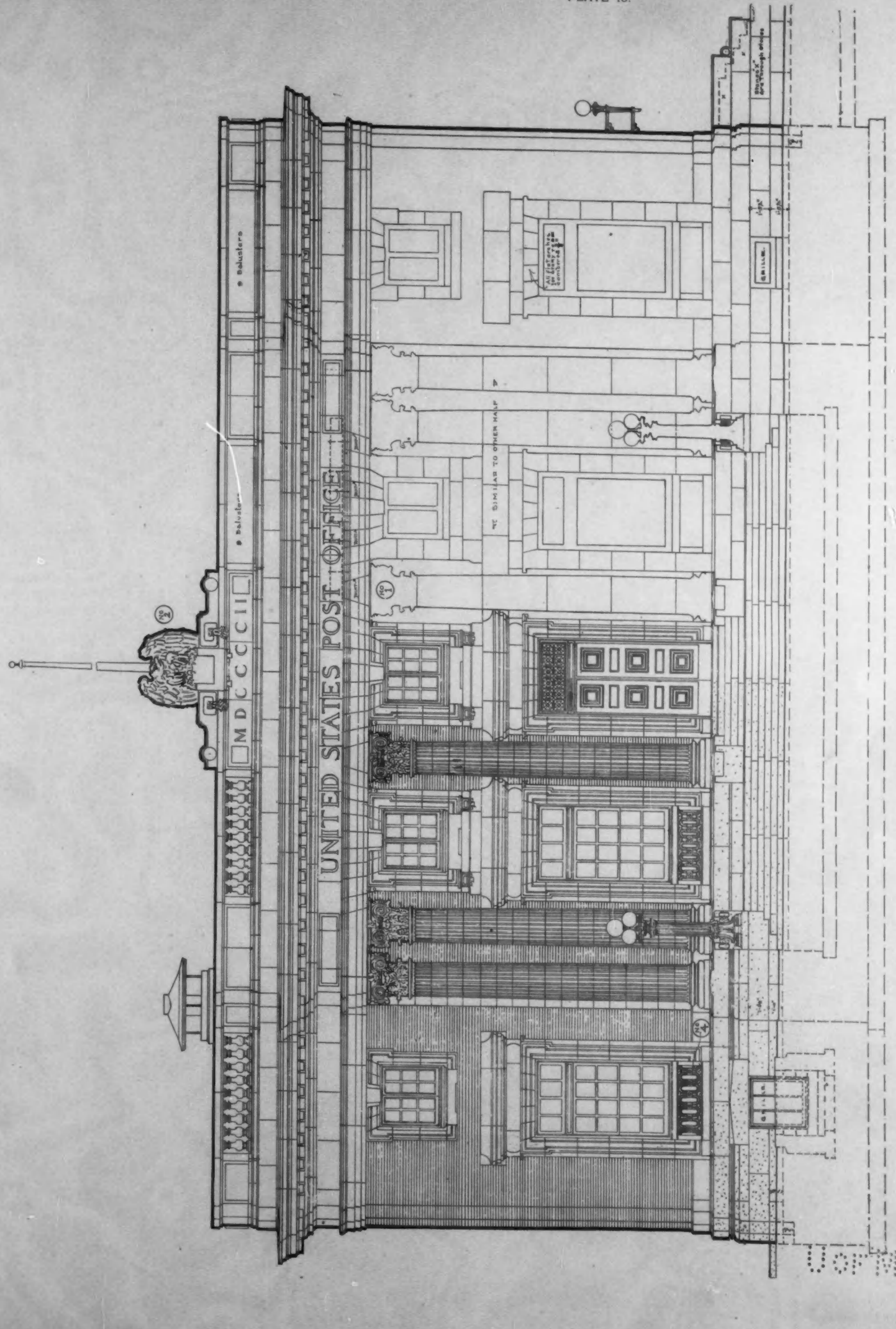

A NEW CITY HALL.

COPE & STEWARDSON, ARCHITECTS.



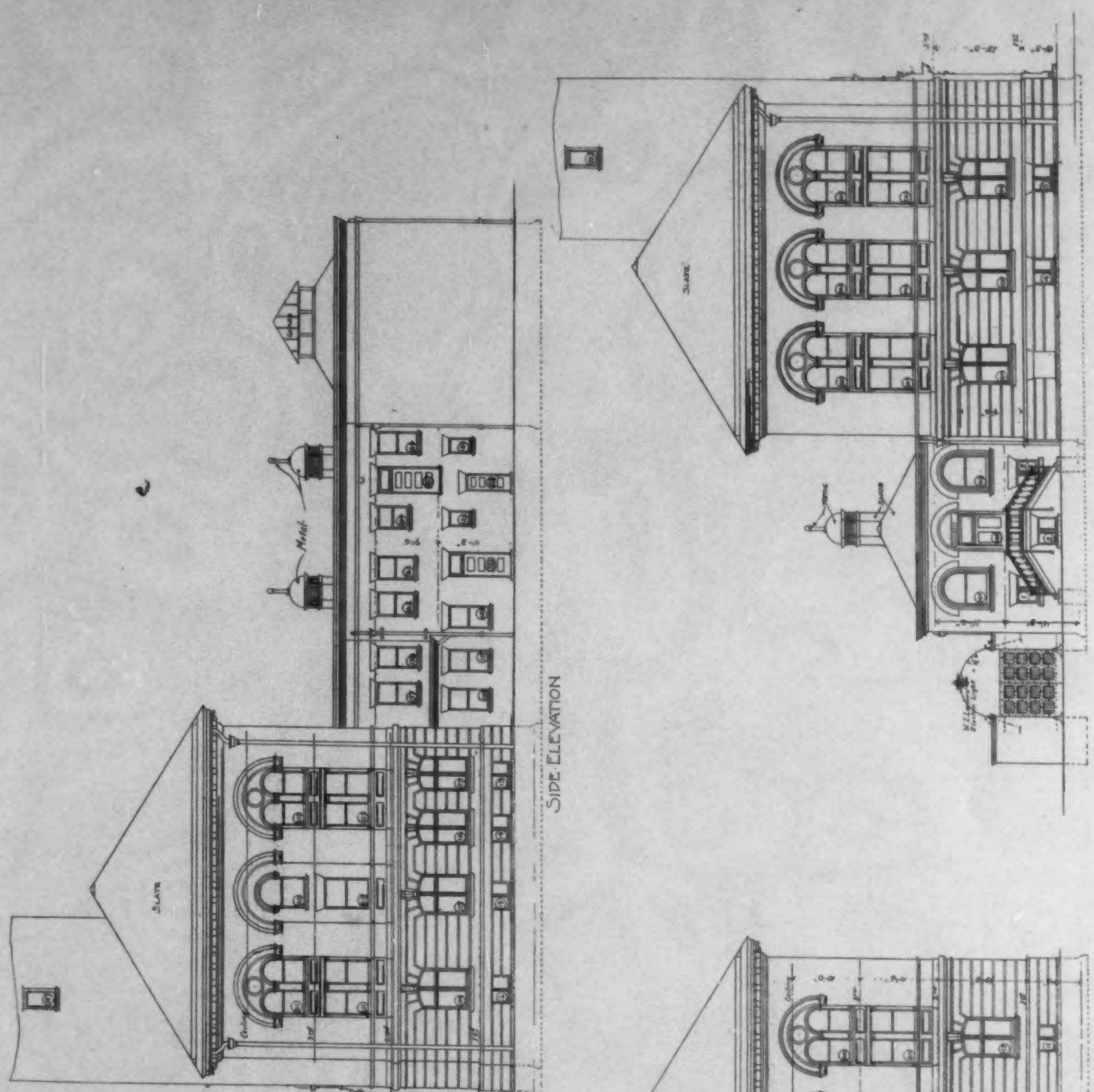

DETAIL OF FRONT, UNITED STATES POST OFFICE AT JANESVILLE, WIS.

JAMES KNOX TAYLOR, ARCHITECT.



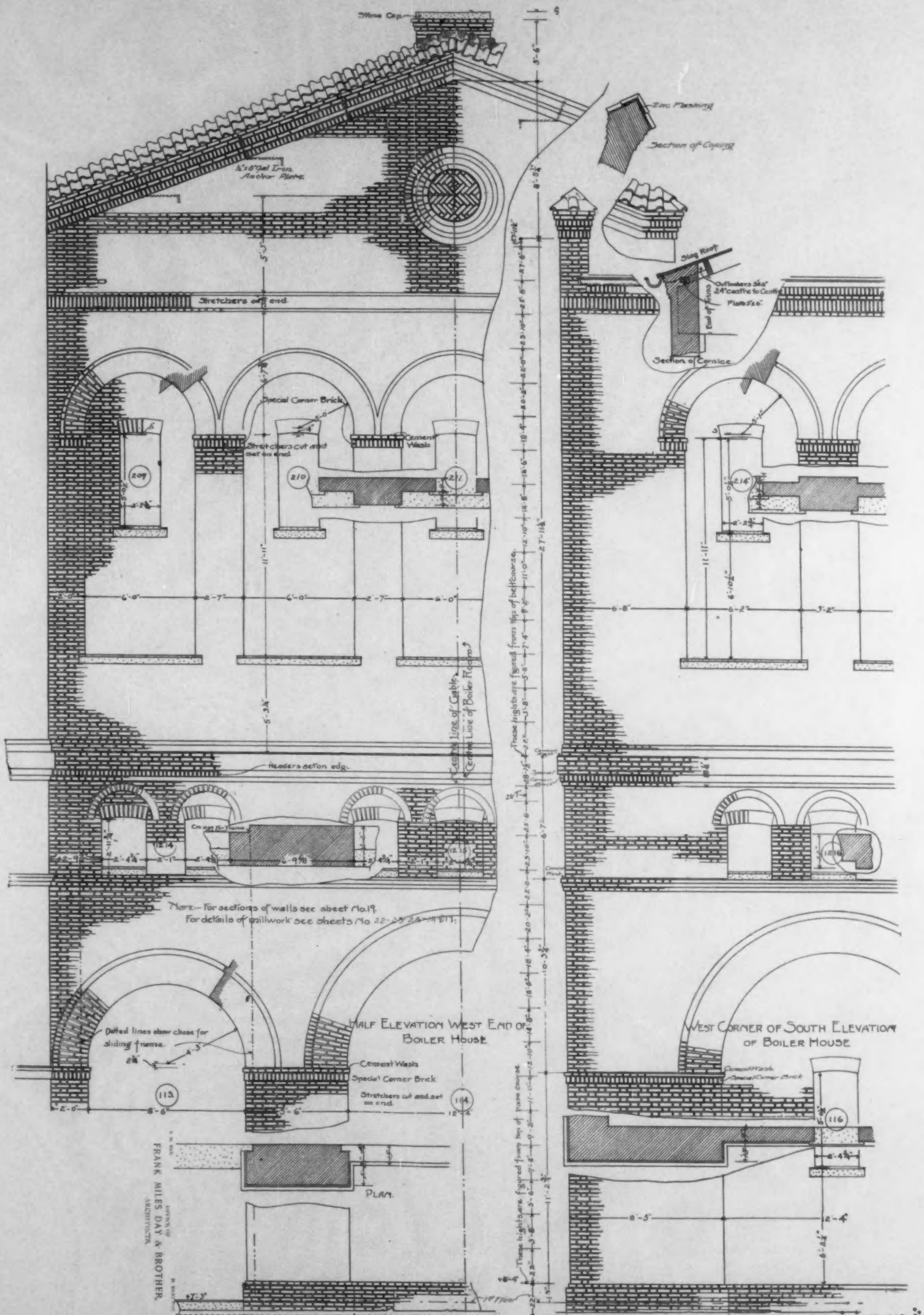

UNITED STATES POST OFFICE AT JANESVILLE, WIS.

JAMES KNOX TAYLOR, SUPERVISING ARCHITECT.




A NEW CITY HALL.

COPE & STEWARDSON, ARCHITECTS.



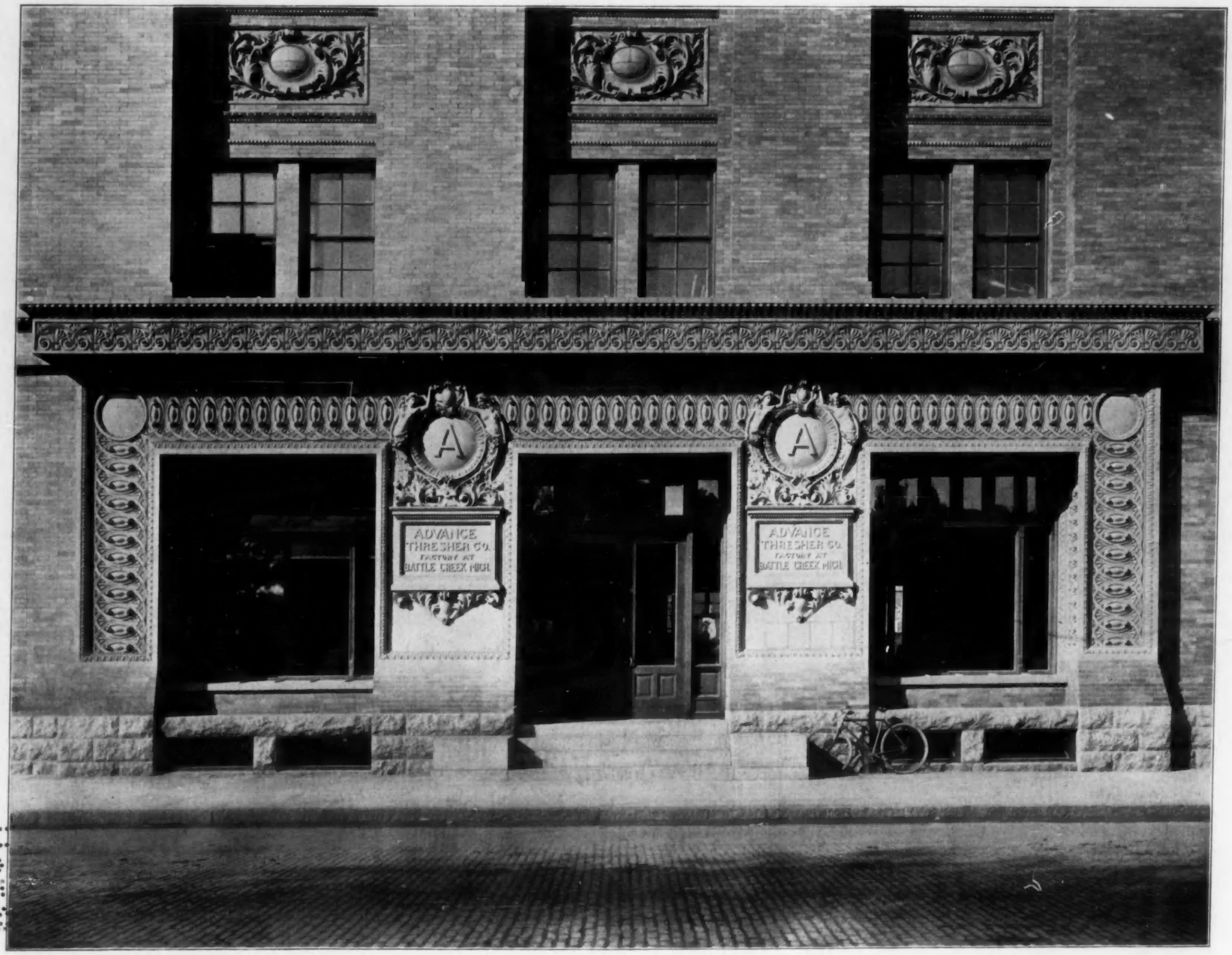

DETAIL OF FRONT ELEVATION, ICE-MANUFACTURING PLANT, PHILADELPHIA, PA.

FRANK MILES DAY & BROTHER, ARCHITECTS.


CORN EXCHANGE NATIONAL BANK, PHILADELPHIA, PA.
NEWMAN WOODMAN & HARRIS, ARCHITECTS.

THE BRICKBUILDER,
FEBRUARY,
1902.

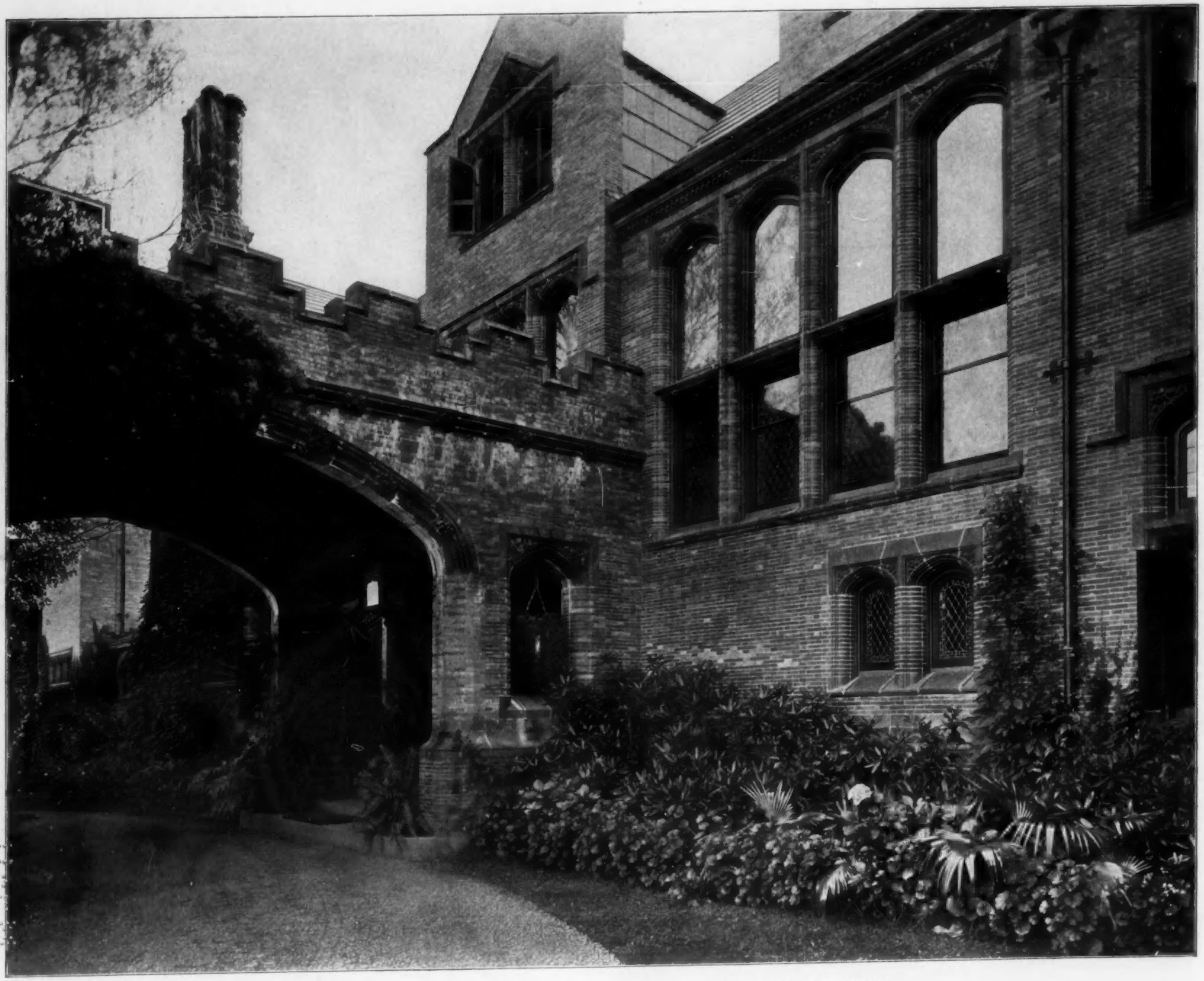
"WYNDHURST," HOUSE OF JOHN SLOANE, ESQ., LENOX, MASS.
PEABODY & STEARNS, ARCHITECTS.




DETAIL OF ENTRANCE TO ADVANCE THRESHER COMPANY BUILDING, MINNEAPOLIS, MINN.

KEES & COLBURN, ARCHITECTS.

THE BRICKBUILDER,
FEBRUARY,
1902.



"WYNDHURST," HOUSE OF JOHN SLOANE, ESQ., LENOX, MASS.

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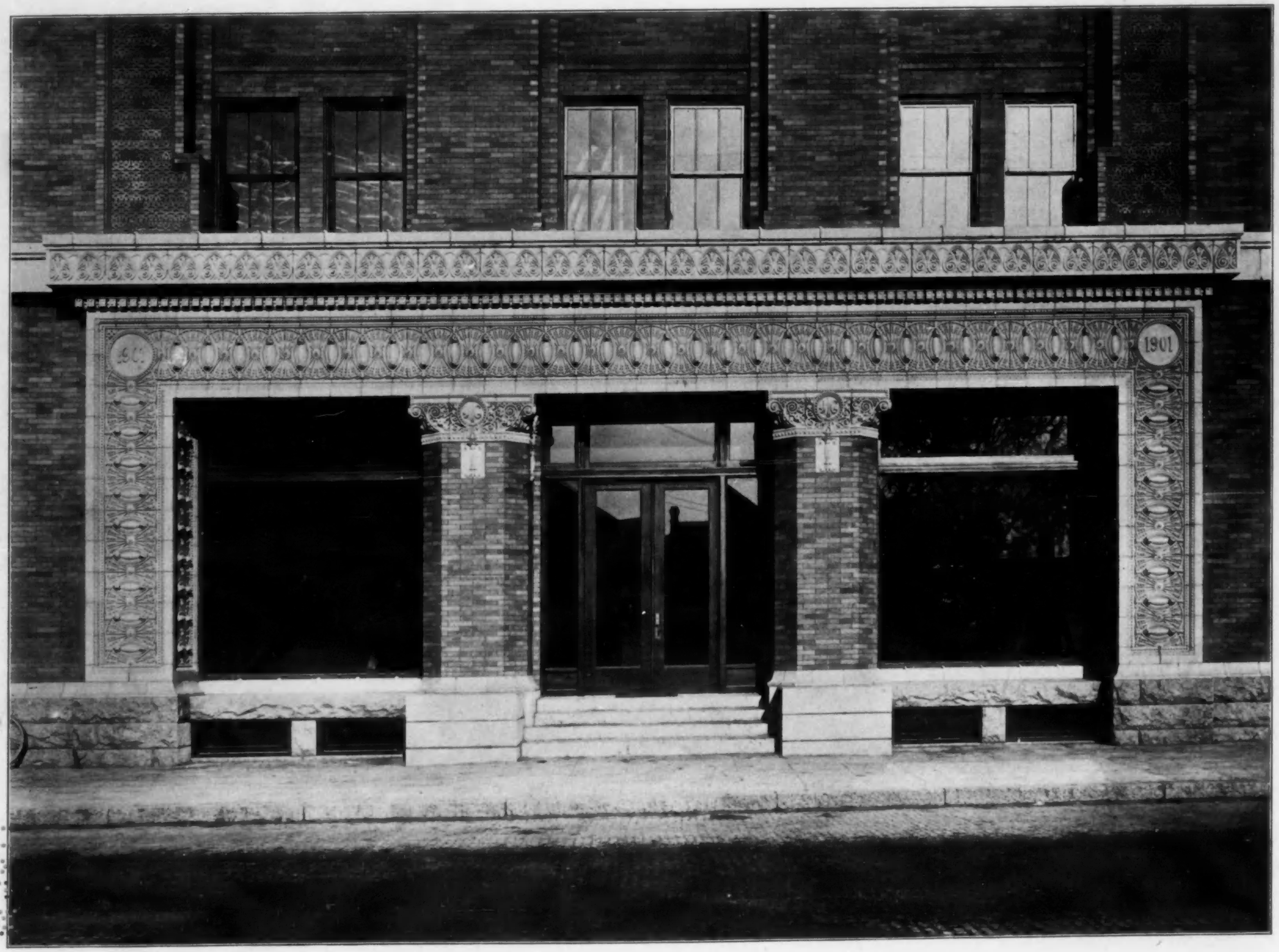


DETAIL OF ENTRANCE TO J. I. CASE BUILDING MINNEAPOLIS, MINN.

KEES & COLBURN, ARCHITECTS.

TOWN HALL, EAST ORANGE, N. J.
BORING & TILTON ARCHITECTS.